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Conservation — Why a Engineer? — Industrial Safety

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Cover Credit: The 4,745-foot Harvard Street Bridge, erected by the Allied Structural Steel Company at Peoria, Illinois. Steel units of the 28-span bridge were placed in position by floating derricks and hoists. See story and pictures on Page 21.

COMING IN THE OCTOBER ISSUE:

WATER CONTAMINATION

ATOMIC BOMB HITS CITY "X"

MUNITIONS BOARD

Evolution

As you turn the following pages, you will in effect hear for the first time a new voice of an old organization, the Western Society of Engineers.

Since 1896, the Society has published a "Journal" under several formats, which has been basically a journal or record of engineering material presented at WSE meetings, and supplemented of late by a separate publication containing meeting announcements, personal items and the like. Although the need for such a record still exists, a new form and frequency of issue have been adopted for various reasons. In part these arise from a desire to conform to the more generally accepted periodical size and to stimulate a reasonable volume of advertising.

In addition to these desires for a more distinctive, more appealing magazine, the change in format is accompanied by a change in editorial policy which will make the MIDWEST ENGINEER reflect the broadened, general aspect of the present Society. Articles on technical subjects will not be presented in the detailed, highly technical manner so ably and properly used by our sister societies and their publications, but in a simplified and well illustrated manner so as to be useful to engineers in the other branches of engineering, and wherever possible, to the layman as well. Going still farther, articles on subjects other than engineering but related thereto, such as financial, economic and civic matters, will be included from time to time, to the extent welcomed by our readers.

In short, the presentation of previous discussions is made secondary to the presentation of new and not otherwise readily available material. Our objective will not be to make electrical engineers better electrical engineers, or mechanical engineers better mechanical engineers, etc., but rather to try to make them all better engineers from the reading of our magazine. The comments of each of you, our readers, will largely determine our progress toward this end. We will welcome your suggestions at all times.

Change is the immutable law.

—Elbert Hubbard

Chicago's Construction Moves Ahead

H. Mayne Stanton*

Because the construction industry of Chicago and the nation has been unable to produce, through magic or otherwise, processes which will provide houses, bridges, highways, commercial, institutional and industrial establishments, on a while-you-wait basis, the fact that its performance since the war has demonstrated unprecedented progress is too often overlooked.

No major industry suffered greater dislocations because of the war than did construction. Yet no major industry has made a more rapid comeback.

There is no necessity to apologize for what the industry has accomplished, but it is only fair to mention that it is just emerging from a long period that had been demoralizing in the attainment of material supply and in labor efficiency.

H. Mayne Stanton

First came the depression, during which lack of opportunities for employment encouraged many kinds of make-work or restricted work programs. Then came the war period, during which cost was a secondary factor, and large numbers of untrained workers were necessarily employed on construction projects. Finally came the early postwar years when labor and material shortages combined to retard improvement in general productivity.

It could not have been expected that the effects of that long period of progressive demoralization would be immediately overcome. Nevertheless management, as well as labor, has taken progressive actions which assure the public that the industry will efficiently satisfy all of the needs and demands that will arise.

Such assurance is justified when we give recognition to such facts as these: The industry has broken all past records in production of building matrials; it has more than doubled the physical pre-war year that was not affected by war demand; its skilled manpower has been sizeably increased through accelerated apprentice training programs and other cooperative efforts; its improved productivity is everywhere evident in the drastically shortened building time.

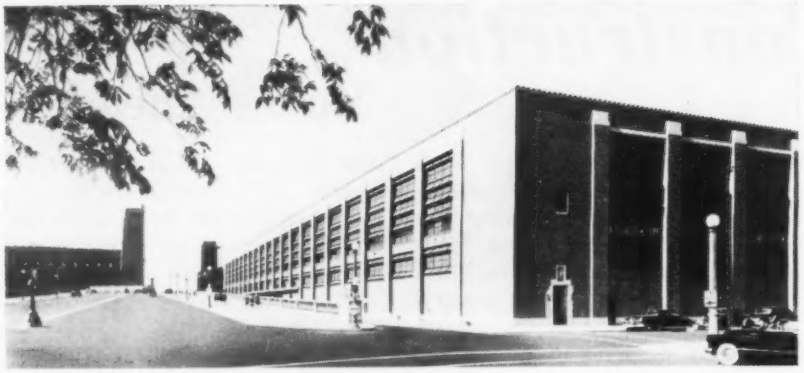
A significant step toward the joint solution of management and labor problems within the industry was taken by the Associated General Contractors of America and the Building and Construction Trades Department of the American Federation of Labor and seven national organizations of specialty contractors in the establishment of the National Board for the settlement of Jurisdictional Disputes. The settlement of these disputes, on a national basis, without stoppage of work, represents a saving to labor, to management and to the public. The plan demonstrates that the industry is striving to work out its own problems, and that management and labor are trying to work together to concentrate their productive capacity on the building of a greater country.

The formation of this Joint National Board is gratifying to Chicago for the plan closely resembles that of the Building Construction Employers' Association of Chicago and the Building and Construction Trades' Council of Chicago and Cook County which has been used so successfully in the settlement of local jurisdictional disputes

(Continued on Page 4)

This view shows the plant office of the Chicago Bridge & Iron Company's new steel plate fabricating plant at Salt Lake City, Utah. A portion of Shop No. 1 appears in the background.

*Executive Secretary, Building Construction Employers Association of Chicago



South Plant of The Lakeside Press, R. R. Donnelley & Sons Company. The Calumet Building, with its tower, is visible at the left.

(Continued from Page 3)

throughout the last thirty years. Chicago is one of three cities in the United States which, through authority provided by the Building Trades Department of the American Federation of Labor, has the privilege of adjusting its own labor disputes in matters of jurisdictional controversy.

Chicago's construction work continues high in volume, city permits for the first seven months of 1948 amounting to $86,195,600, compared with $51,777,500 for the same period last year. The July total, $19,980,600, was the highest of any month during the last two years. New construction in the nation this year will probably reach $18 billion, or a gain of 29 percent over 1947.

Although the dollar volume of new construction is expected to make a new record, the "physical volume will remain below the previous peaks", comments the Commerce Department. No changes have been made in the estimate that 950,000 privately financed dwelling units, a new record, will be started in 1948, but the prediction that publicly financed units will total 20,000 has been reduced to 7,500.

It now appears certain that the Chicago construction volume for work which can be classified as essential will be maintained for some months to come. Residential building has been on the increase, and commercial, industrial and institutional programs are substantial. The Commonwealth Edison Company, Illinois Bell Telephone Company and the meat packing companies are proceeding with their construction plans. New hospitals, hospital expansion, schools, multiple dwellings and industrial developments continue to reach the start of construction stage.

During the last several weeks, for instance, work began on such projects as the new research laboratory of the Portland Cement Association, Community Development Trust Apartment Building, Barrington High School, three schools in Elmhurst, Wieboldt stores, Flossmoor Community Church, St. Paul's Evangelical Church, Atomic Energy Research program of the University of Chicago, Ebenezer Christian Reformed Church in Berwyn, extensive State of Illinois Armory alterations, Western Electric Company Chicago plant (modernization), Chicago Osteopathic Hospital, Fair Store alterations, Consolidated School District at Des Plaines, Highland Park Hospital addition, on several railway company structures and on a considerable number of commercial units.

Work is progressing on nine new buildings for the Chicago Board of Education and renovating is being done at 204 elementary schools, 33 high and vocational schools, plus stadiums and playgrounds of the school system. The Board has approved $11,517,868 in 1948 building appropriations, and plans for 1949 will run an estimated $2,923,-500.00.

Chicago's position as the nation's center of commerce and industry has been enhanced by virtue of post-war factory construction and industrial expansion totaling more than half a billion dollars, according to statistics just announced by the Chicago Association of Commerce & Industry. Construction projects of 702 industrial plants in the five Illinois Counties and one Indiana County of the metropolitan district now aggregate $501,133,000. Leverett Lyon, chief executive of the association, says: "This is the largest development of all the industrial areas in the United States since the war, and marks the greatest expansion era in Chicago's 100 years of progress."

During the war years alone, Chicago invested three hundred million dollars more than any other area in development of its manufacturing facilities. This broadening of the area's industrial base was coupled with projects totaling $138,527,000 for the 12 months ended July 31, and the record of $184,000,000 development during 1946.

Among major industrial improvements currently under way, or planned for the near future, are: First of a series of buildings being constructed by the Westinghouse Electric Corporation, construction of a new plant for Hotpoint, Incorporated, a special unit for the General Electric Company, a two-unit expansion program by R. R. Donnelly & Son Company, several new units by Armour & Company, new additions to the Electromotive Division of General Motors Corporation, a multiple-story unit for Florsheim Shoe

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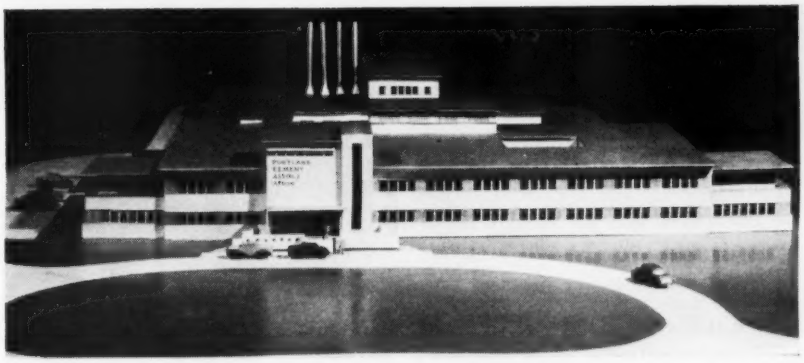
Company, additional plants by Standard Oil Company of Indiana, and projects planned by Inland Steel Company and Socony Vacuum Oil Company.

Construction is also under way on the A. B. Dick Company plant in Skokie, new additions to the Hammond plant of Lever Brothers, and the Starck Piano Company plant. Other new plants include those of the Rheem Manufacturing Company, Cities Service Company, Spencer Chemical Company, Sunbeam Corporation, Illinois Moulding Company, Weber Lithographing Company, Adroit Machine Company, Gibson Machine Company, Chicago Bridge & Iron Company (Salt Lake City plant), Allstate Insurance Company, Spraying System Company and many others.

As there is considerable interest in the Housing Act of 1948, as passed by the 80th Congress, at its special session, reference should be made to the provisions of the new law. It authorizes FHA loans up to 95 per cent on homes costing $6,000.00 or less; makes a $4,500.00 house, instead of the present $3,000.00 limit, eligible for loans under Title 1 of the present National Housing Act and boosts by $35 million money available for such loans; makes another $800 million available for so called Title VI rental housing loans; sets $8,100.00 an apartment cost limit on large scale rental projects instead of the present room limit costing $7,500.00 or less, in projects of at least 25-family units; and it liberalizes loans to prefabricated home manufacturers.

It allows the Federal National Mortgage Association, an RFC subsidiary, to provide a secondary market of 50 per cent, instead of 25 per cent as now, of all loans made after April 30, 1948; it establishes a division in the Home Finance Agency to work toward standardization of building codes or FHA insured loans and guarantees a return of 2¾ per cent on equity investment in large scale rental projects.

It is definitely established that the construction industry comes under the jurisdiction of the Taft-Hartley Act. Our principal interest is in just what manner National Labor Relations Board rules and interpretations will influence collective bargaining agreements. It should be noted that the question of coverage of employers in the building and construction industry, under the original Wagner Act, was not of great significance in view of the highly organized state of the industry at and before the effective date of that law.



Model of Portland Cement Association's new research and development laboratory now being built in Skokie, Ill.

A. B. Dick Company's new plant, on Touhy Avenue, in the Village of Niles, Illinois.

Furthermore, that law did not purport to be a comprehensive regulation of the relations under collective bargaining agreements, nor did it contain provisions designed to protect the individual employee from "union bossism." The new act, however, imposes new affirmative obligations upon employers and likewise contains the threat of substantial civil damage actions. Therefore, the question of coverage is a vital one. Proper procedure to follow in the renewal of working agreements must now be thoroughly investigated.

There is nothing in the Taft-Hartley Act which violates, or threatens, the right or prerogatives of labor. It seeks to stop jurisdictional strikes and secondary boycotts. It gives employers the same rights as labor, but takes away none of labor's rights, either to strike or bargain collectively. It requires union responsibility in handling and reporting funds, and in honoring contracts, which the best of labor leadership has always endorsed. But, as I have stated, there is need for authoritative pronouncements by the Labor Board and, possibly, court tests, before the construction industry knows where it stands under the law.

Construction, like many other industries, still could suffer from a general belief that costs are too high. Construction costs, compared to before the war, are high, but the important fact is that they are not out of line with the costs of other services or commodities. An interesting comparison has been made of construction costs with the wholesale commodity price index, considered a good indicator of the general price trend. On the basis that the 1939 average equals 100, the wholesale price index, compiled by the United States Bureau of Labor Statistics, now stands at 196. Various construction cost indexes now stand at about 160.

(*Continued on Page* 16)

A BRIEF SURVEY OF CHICAGO BUILDING COSTS

Verne O. McClurg*

Fluctuations in building costs are portrayed by the set of index numbers and the illustrative chart shown on the opposite page.

It is different from most others in that an attempt was made to cover a rather long period of time in which four wars have occurred; also in that it was made to apply primarily to commercial and industrial buildings in the Chicago area. It is based largely upon opinions of men in the building field and its values may have been influenced somewhat by those of similar indices. No special claims for accuracy are made.

There are at least ten or twelve well known construction cost charts kept up to date by general contractors, trust companies, appraisers and trade magazines. For example, the Engineering News Record publishes two, one for general construction and the other for buildings, in addition to a construction volume index corrected for cost fluctuations.

Various methods are used in arriving at such index figures. Some are based upon combined and weighted costs of fixed quantities of basic materials and labor, some are estimates of cost of a particular building or a selected group of buildings of different types with costs of materials and labor assumed at prevailing rates. Still others are based upon opinions of

Verne O. McClurg

one man or a group of them. Some are for a particular locality or region while others are for application to the whole country. Some are for general work only and do not take into consideration mechanical work, electrical work and elevators. Some do not attempt to allow for labor efficieny, competitive conditions, taxes, and similar items whereas others do.

With so many different methods of arriving at results, it is somewhat surprising that the general trend of construction costs is always found to be substantially the same. Perhaps this is because building costs as well as wages and the costs of all commodities tend to vary inversely with the value of money. As a matter of fact, index numbers prepared by the U. S. Department of Labor for "all commodities" could be used for completed buildings without too much error.

It is undoubtedly true that many indices for building costs give results too high in times of depression and too low in times of great building activity because it is difficult to give proper weight to such factors as labor productivity, variations in profit and overhead of general contractors and subcontractors due to economic conditions, loadings added in recent years by social security and high taxes, delays by reason of scarcities of materials, etc. For instance, during the early nineteen-thirties when there was very little construction work, manufacturers, contractors and practically everyone else in the building industry did work at little or no profit in order to keep plants going and organizations together. In recent years it has been natural to try to make up for losses incurred during the depression and to get prepared for another possible slack period. This has doubtless been one of the many factors which have resulted in the sharp rise in building costs which started before World War II and still continues.

But whatever the reasons, the fact remains that present building costs (July, 1948) are about seven times as much as they were before the Civil War, something like six times those of the nineties, four times those of 1913, three times those of the depth of the depression, and a little more than double those of the middle twenties. At this time the curve is still climbing rapidly with no sign of leveling off.

*Partner, Mundie, Jensen & McClurg
President, Western Society of Engineers

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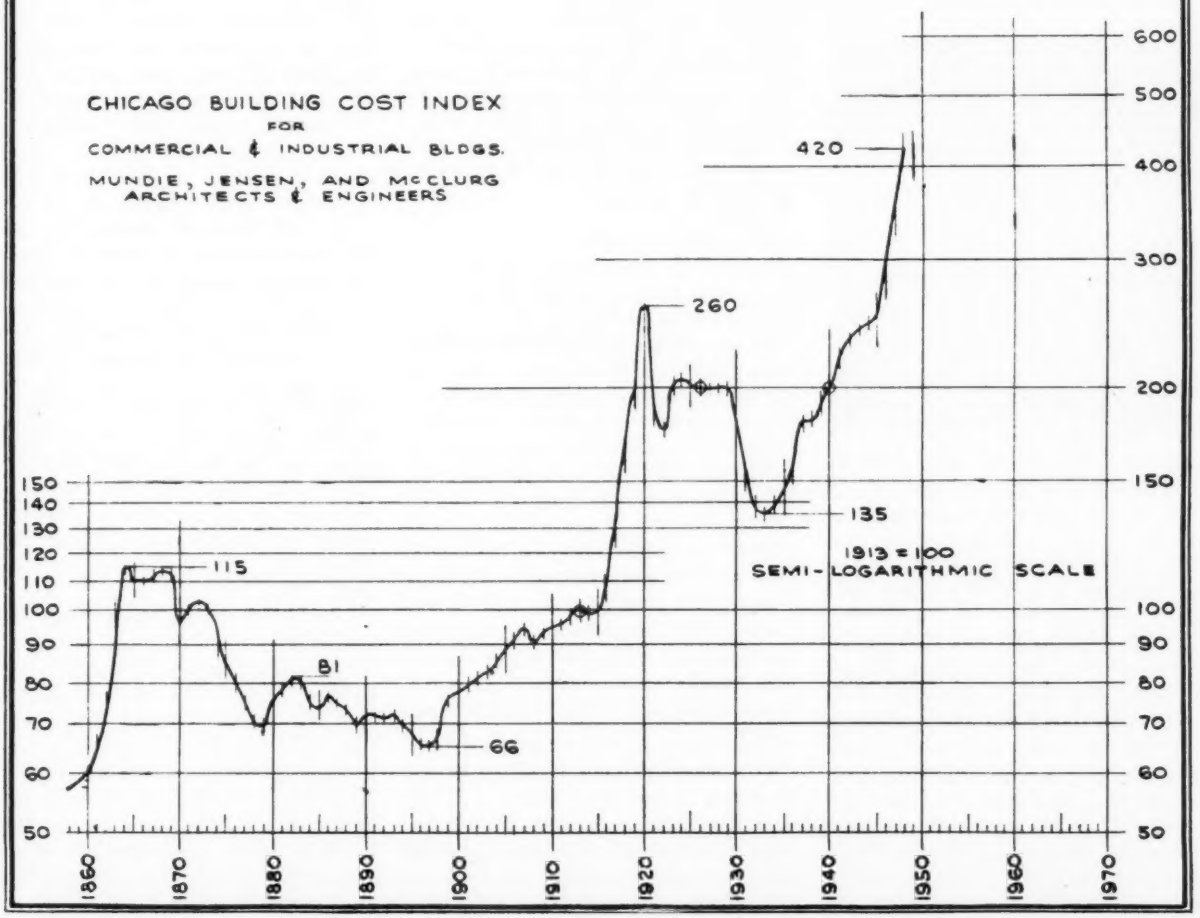
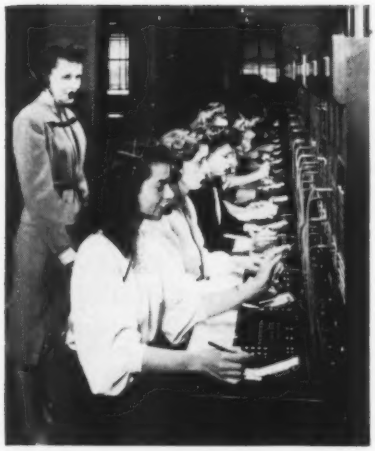
Chicago Building Cost Index

		1875	86	1900	78	1925	200	1950	
		76	82	01	79	26	200	51	
		77	77	02	81	27	200	52	
		78	70	03	83	28	200	53	
		79	70	04	84	29	200	54	
		1880	76	1905	88	1930	180	1955	
		81	78	06	90	31	165	56	
		82	81	07	95	32	140	57	
1858	58	83	80	08	91	33	135	58	
59	60	84	75	09	93	34	140	59	
1860	60	1885	74	1910	95	1935	150	1960	
61	65	86	77	11	96	36	160		
62	70	87	75	12	98	37	180		
63	90	88	73	13	100	38	180		
64	115	89	70	14	98	39	190		
1865	110	1890	72	1915	100	1940	200		
66	110	91	72	16	112	41	220		
67	110	92	71	17	130	42	235		
68	112	93	72	18	163	43	240		
69	112	94	70	19	191	44	245		
1870	96	1895	68	1920	260	1945	250		
71	99	96	66	21	190	46	300		
72	102	97	66	22	177	47	360		
73	101	98	68	23	200	48	420		
74	95	99	76	24	204	49			



ILLINOIS BELL TELEPHONE COMPANY

EXPANDS FACILITIES



A few of the Illinois Bell Telephone Company operators whose nimble fingers and smiling voices keep calls flowing smoothly. Note new-type headsets.

The Illinois Bell Telephone Company is building a "Telephone City", adding to its present facilities and improving service in the greatest expansion program in its history.

Under streets, atop telephone poles, in giant Chicago and tiny communities, in huge new dial buildings and in small rural offices is going $250,000,000 in improvements which will bring better telephone service to all who want it.

Of course, Illinois Bell's new "Telephone City" isn't bunched into one small area. It is made up of 69 buildings—18 brand new and 51 additions—which have sprung up in 56 cities and towns during the last three years. Many others are under construction and still more are scheduled and the total will reach over 100.

As the demand for telephone service grows, more buildings are required. The program means hundreds of switchboards, thousands of miles of cable and wire, more tons of intricate equipment, plus the latest in telephone developments. The list of those waiting for telephones was slashed from 102,600 on V-J Day, to 22,356 three years later. This decrease came while other telephone orders coning centers of the world. Here Illitinued to flow in. In three years since the war ended, 495,176 new telephones were installed—300,000 of them in the last two years. This had to be done in the face of severe shortages, with thousands of new employees, and in spite of low company earnings—and while the company was expanding its television, mobile and other services.

On June 30, there were 2,332,035 Illinois Bell telephones serving 72% of the families in IBT territory—an increase of 11% since V-J Day. A good portion of this growth, too, was in rural areas where the number of telephones soared from 40,190 to 65,270. Right now, more than 64% of the farms in Illinois Bell territory have telephones.

In three years since the war, enough wire in cable — 1,300,000 miles of it—has been installed to reach Berlin and back 127 times, with two round trips to Moscow thrown in for good measure; $39,000,000 in new dial equipment and 1,160 new switchboard positions have been added.

Of all the buildings constructed or under construction, the biggest is the company's second Long Distance Center at the corner of Clark and the proposed Congress Street superhighway in Chicago. In this modern $12,000,000 (for land, building and equipment) 11-story structure—which is scheduled to be cut into service in December—a veritable maze of complex switching equipment of the latest type is being installed, along with offices and switchboard positions for operators. In the basement is terminated the Chicago-Terre Haute coaxial cable, and the upper floors will provide more space to house a large group of telephone employees.

The new Long Distance Center is the first of its kind in Illinois Bell territory and there will be only two others like it in the U. S. at the time it goes into service. It will help handle Chicago's long distance calling load, and will retain for the Windy City its distinction as one of the largest long distance switchnois Bell seeks not only to speed switching of long distance calls but to provide sufficient lines so that any delays, caused by lack of circuits, can be eliminated.

The new Center will be linked with other connecting companies and Illinois Bell State Area cities —joining them to the long distance dialing network. All present toll centers now having dial equipment and all those going to dial will be equipped for eventual two-way operator dialing. Operator dialing, which involves no change for the customer in placing a long distance call, is the method by which a long distance operator dials directly to telephones in distant cities.

"Brains" of the new Long Distance Center is a new improved Toll Switching System. This System is a mechanical means for handling outward and inward calls between toll centers and between a toll center and local exchanges served by the toll center. It will also handle calls going through toll centers to other cities.

All connections established by the new system will be on a full mechanical basis. For completion, an incoming sender temporarily associated with an incoming dial trunk registers the pulses received over the trunk, and controls the completing equipment. The completing equipment is so arranged that if an outgoing trunk to a local office or another toll office is of dialing type, pulses are sent over the trunk to control switching at that office and, in some cases, beyond that office.

Illinois Bell's present long distance center in Chicago's 212 W. Washington Street Building is a beehive of activity. At this center, operator dialing, which can clip a full minute off the average time needed to start conversation on a long distance call, began on a limited scale between Chicago and New York in July—after months of engineering, equipment changes and training of hundreds of operators. On the average the telephone in New York wanted by the Chicago

caller will be ringing 11 seconds after the Chicago long distance operator has the necessary information about the customer.

Another big job facing Illinois Bell this year is the change in all Chicago, Evanston and Winnetka telephone numbers. On September 18, a new figure will be added to every telephone exchange name in these three cities. In dialing, it will replace the third letter. For example, SUNnyside 1234 will become SUnnyside 4—1234. You will dial SU 4 1234. If you call from telephones without a dial, you'll ask the operator for "Sunnyside four (PAUSE) one two three four."

Chicago and its suburbs are growing too large for their present numbering plan. The new plan will give Illinois Bell twice as many usable dialing combinations in Chicago and suburbs. It will also tie in with the company's plans for faster service on out-of-town calls and other telephone improvements.

The company is expanding mobile service, too. By the end of 1948, Illinois Bell expects to complete installation of two additional transmitters at Kankakee and Centralia, and four at Chicago. Four more transmitters are slated to be built in 1949. This will bring to 16 the number of transmitters in operation throughout the state. In June, Illinois Bell had 517 mobile telephone customers who made a total of 16,440 calls.

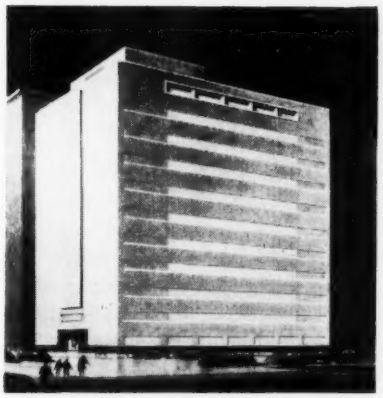
During the last year, almost 100 circuits — voice highways — were added between the company's toll centers, including a new buried cable between Danville and Champaign. Plans for 1948 call for almost 600 more of these voice highways between toll centers, and another 600 tributary circuits. Practically all of these will be weatherproof buried cable. Hundreds of circuits have been added between Chicago and other major cities of the United States, providing more paths for telephone conversations. Last January, a new coaxial cable route between Chicago and St. Louis, via Terre-Haute, was opened, initially providing three-score circuits between the two cities.

A radio relay system connecting Chicago and New York eventually will add hundreds of message circuits between these two cities. It is planned for completion in 1950.

A coaxial cable stretching 850 miles from Chicago to Philadelphia will be in the ground by the end of 1948 or early 1949. The Midwest television network, connecting Buffalo, Cleveland, Toledo, Chicago, St. Louis and Milwaukee is expected to be ready for service this fall. Connection between this network and the east is expected shortly after the Philadelphia-Chicago route is completed.

While the construction program has been booming along, a "constructive" employee program is in operation. Speedier and more efficient training programs are putting hundreds of operators at switchboards more quickly than ever before. Efforts are being made to train employees to do a better job and to contact the public in a more pleasing and helpful manner. This has been helpful in more than one way. A larger volume of long distance business is being handled better than it has been handled in some time. Speed of completions on long distance calls has been cut nearly in half, and will improve still more.

Illinois Bell Telephone Company's New Humboldt dial building, located at the northwest corner of Richmond and Cortland Streets. The modern four-story building is part of Illinois Bell's $250,000,000 expansion and service improvement program.



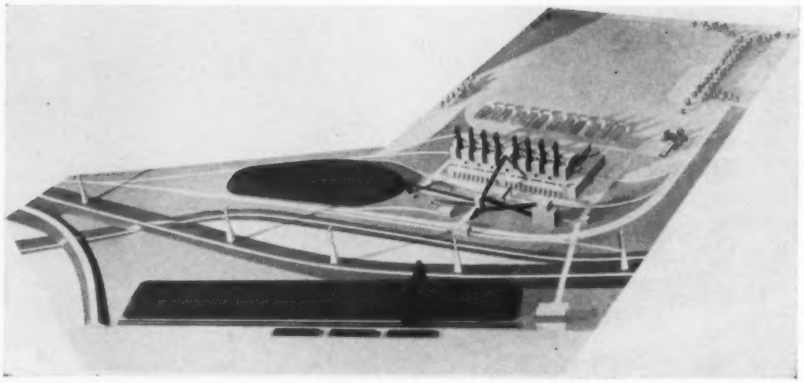
Chicago's Long Distance Center at corner of Clark Street and proposed Congress Street Superhighway. Will be cut into service in December.

Even with the expansion of dial service and other technological improvements the number of Illinois Bell employees has about doubled in the last 10 years. In June of 1938, the Company had 23,953 employees; 28,950 in 1943 and 43,320 last June.

Under the $250,000,000 service improvement and expansion program, equipment has been added in every one of the Illinois Bell's 342 exchanges—and company officials are looking forward to an even brighter future in telephone development and service.

Gas and Electric Utilities

Plan Improvements



Model maker's conception of how Ridgeland Generating Station will appear when extended to its ultimate capacity.

A combined construction program by The Commonwealth Edison Company, Public Service Company of Northern Illinois, Western United Gas and Electric Company, and Illinois Northern Utilities Company will require the expenditure of approximately $400,000,000 to complete within the current five-year period. This large outlay for gross additions to utility plant is required to correct the deficiencies in reserve capacity which accumulated during the war years due to necessary goernmental restrictions on new construction, and to provide additional facilities for the steadily increasing demand for electric power in the 1,000 square-mile area served by these companies.

Five and one-half million people live in this area which contains the greatest concentration of industry in the world. Bringing the reserve capacity up to normal when added to the construction required for steady load increase has resulted in the program.

Since the easing of restrictions with the end of the war, the four utility companies named have been engaged in an "all out" construction program, and it is going ahead at an increasing tempo, but based on present load estimates, it will take several years to bring the system reserve capacity to its desired level.

In 1946 and 1947, in spite of the severe limitations imposed on construction work, due to the critical shortages of materials and equipment, expenditures for gross additions to plant amounted to $37,400,000 and $61,000,000 respectively. These expenditures, however, served to relieve only the most critical situations and provided only a small part of the total capacity that would have been added to the system in normal times. In order to increase the capacity to meet the requirements of the existing load, and the estimated additional load for the five-year period, 1948 to 1952, the total expenditure of about $400,000,000 will be spent as follows:

Generating Stations	$144,000,000
High-Voltage Transmission Lines	30,000,000
Substation and Distribution Facilities	153,000,000
Gas Facilities	48,000,000
General Plant	25,000,000

The need for additional generating capacity in this field was severely limited during the war years. Prior to the war, the companies had ample reserve generating capacity. Due to the unavailability of major units of new generating equipment during the war, the system reserve was gradually reduced as the system peak load increased. Plans for certain generating units in process of installation at the outbreak of the war were canceled by government order.

The restoration of adequate reserve capacity (normally considered to be 300,000 kilowatts in addition to reserve capacity available through interconnections), since the termination of the war has been delayed by the large demands for generating equipment placed upon the manufacturers by utilities throughout the country. In December, 1945, a new 50,000-kilowatt unit was placed in service in the Dixon Station of the Illinois Northern Utilities Company, and in September, 1947, a new 107,000-kilowatt unit was placed in service at Edison's Calumet Station. No further additions to generating capacity are scheduled for service prior to the spring of 1949.

The principal Edison electric generating units now under construction are:

(1) A 150,000-kilowatt unit and related steam generating equipment in the existing building at Fisk Station in Chicago, scheduled for completion in the early part of 1949.

(2) A new electric generating station to be known as Ridgeland Station and to be located a short distance west of the City limits of Chicago to contain two generating units, each of 150,000 kilowatts capacity. The first unit is scheduled to be in operation by the end of 1950, and the second unit by the end of 1951.

This new station will incorporate the most recent developments in boiler and turbine design. Each unit will consist of a high-pressure, 3600-rpm turbine with a 50,000-kilowatt generator and a low-pressure, 1800-rpm turbine with a 100,000-kilowatt generator.

The high-pressure turbine will be designed for a throttle steam pressure of 1800 pounds per square inch at 1050 degrees

Fahrenheit, and will exhaust directly into the low-pressure turbine at a steam pressure of approximately 435 pounds per square inch.

There will be two boilers per unit, each with a capacity of 730,000 pounds of steam per hour at 1050 degrees. The boilers will be equipped with cyclone furnaces. The station is expected to deliver one net kilowatthour to the system for slightly less than one pound of fuel burned. The illustration shows a model of this proposed station development.

In addition to these units scheduled for service in Edison stations, a 107,000-kilowatt unit and related steam generating equipment and structures at Public Service Company's Joliet Station is scheduled for completion early in 1950. Another unit of 110,000-kilowatt capacity has been ordered for Public Service Company's Waukegan Station.

When this generator program is completed, the total gross rated capacity added to the interconnected system of Edison and associated companies since the war, including the new Dixon and Calumet units, will be 824,000 kilowatts.

Naturally, this substantial expansion of generating capacity must be accompanied by a similar expansion in transmission and distribution facilities. For instance, in order to connect the new Ridgeland Station to the system, two 66-kv underground lines of approximately 140,000-kw capacity each will be installed between that station and the Crawford Station in Chicago. These lines will be single-conductor, oil-filled cable similar to, but somewhat larger than cables previously installed.

Similarly, in conjunction with the new Joliet unit, it will be necessary to establish a 132,000-volt transmission tie between the Joliet Station and Crawford Station. While in the past, the sub-transmission system from generating station buses to distribution substations in Chicago has consisted largely of 12,000-volt lines, increasing load densities have made some change in this practice necessary. Consequently, 66,000 volts is being extended to supply 66- to 12-kv substations of from 75,000- to 100,000-kw capacity. A number of these substations will be built in and near Chicago to act as sources of supply to 12-kv to 4-kv distribution substations located at or near smaller load centers.

The use of 66-kv line voltage for this purpose will serve to reduce greatly the number of cables and underground conduits otherwise required for such transmission purposes, and the location of a source of 12-kv supply closer to load will reduce the 12-kv line lengths and make possible some simplification in 4,000-volt substation design.

The requirements in the distribution field will, of course, result in a corresponding increase in distribution substations, a considerable number of which are planned throughout the territory of the several companies. Such substations will vary from 1500-kva unit or primary network type installations suitable for the lower density outlying territory to 25,000-kva installations in the more densely loaded metropolitan area. In all of these substations, simplified designs will be utilized to the maximum possible extent and factory-assembled gear will be installed in order to expedite the work.

Beyond these substations, there is planned a great volume of reinforcement and extension of distribution lines at various voltages. There is much to be done in the way of improving existing facilities in all types of plant in order to incorporate the most economical and serviceable of equipment.

In addition to these new facilities for the electric plant, it will be necessary within the next five years for Public Service Company of Northern Illinois, Western United Gas and Electric Company, and Illinois Northern Utilities Company to spend approximately $16,000,000 for gas production equipment, storage, and regulating and compressor stations, and $32,000,000 for distribution facilities.

It will be necessary within this period to spend approximately $25,000,000 on general plant in order to facilitate efficient operation and maintenance of the expanded plant.

Conclusion

The expenditure of $400,000,000 in a five-year period, averaging $80,000,000 per year, is not an easy job when added to the day-to-day operational activities of the system and the temporary expedients that have to be resorted to because of delays in the delivery of equipment and in the progress of construction.

However, there is no alternative because the present system load must be supplied and the system must be expanded now for the estimated requirements of the future.

Assuming that the power demands do not increase more rapidly than now estimated, the construction program above outlined should raise the capacity of this interconnected system to an adequate reserve by 1952 in generating capacity and in transmission and distribution capacity. With this capacity, Commonwealth Edison, Public Service, Western United, and Illinois Northern can expect to maintain their policy of providing adequate capacity for all possible uses and stimulating new uses of electric power which are such an important factor in Chicagoland's leadership in industrial growth.

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Why an Engineer?

W. V. Kahler*

Presented at the Illinois Institute of Technology, May, 1948.

It's a real pleasure to be with you this morning and to see this hearty turnout for a talk on engineering. As you know, we're meeting under the auspices of one of your own student professional engineering branches. This indicates that on your campus there's an active interest in and curiosity about engineering as a profession and a calling. It also shows that there's a strong appreciation of the professional forum as an effective after-graduation medium through which to interpret and broaden the theory you're learning here. As a representative of the Western Society of Engineers, may I congratulate you on those interests and extend to you a cordial welcome to our quarters.

There is probably no other field of human endeavor in which a spirit of curiosity and self-education is as vital to success as in engineering.

Among the pioneer engineers of England was John Smeaton, a civil engineer, who built the noted Eddystone lighthouse on an exposed ledge of rock off the south coast of England about 1759. Smeaton was once asked by the Duke of Argyle, "Pray, who taught you?" "Why," answered Smeaton, "if it please your grace, I believe I may say I was self-taught."

This incident is told by Robert Louis Stevenson, whose great grandfather, grandfather, and father were lighthouse builders. It comes from an earlier period of engineering, but the idea expressed by Smeaton is as true today as it was then.

You Are Your Own Prime Mover

Engineering is — and always will be — largely a matter of self-education. The individual must be his own prime mover.

But, you ask, doesn't **this** approach to engineering overlook the fine work of the engineering schools and their staffs? Assuredly not. It only serves to emphasize the abundant contribution they can make to the engineering background of the willing student.

The engineering college today is staffed with men of high technical experience and teaching ability. The schools are closely allied with industry and current engineering practice. They are in the forefront of engineering research. Their laboratories and technical libraries provide an immense wealth of engineering knowledge. Through these facilities they offer you the **means**—the **opportunity**—for an unlimited engineering education.

But opportunities alone never build achievements. The **dynamic** forces must come—not from the situation—but from the man himself.

The other day a student remarked to me that all too frequently he received no inspiration from his instructors. My comment on that was—"inspiration comes from within." It isn't something that you can turn on and off like water from a spigot. Nor can we put the responsibility for not having it on others. In the final analysis, inspiration is a quality of one's self and each man must search himself for his own measure of it.

Inspiration, in our profession, is the key to much more than mere knowledge. The civil engineer today may easily learn more engineering **facts** and **principles** by the end of his junior year than Smeaton learned in his lifetime. But **knowledge** alone does not suffice. It must be coupled to a strong sense of curiosity about engineering phenomena and to the engineer's love of meeting and overcoming challenges. These qualities—far more than knowledge—have distinguished the great engineers of all ages.

All of you, perhaps, are aiming high in your profession. You are looking forward to recognition for what you do. You hope to stand out from all the others. If this is your ambition, then every day you will want to do everything that society can reasonably expect of you and just a little bit more—and to do it in the best way you know how. If you do that, your future can be bright indeed.

W. V. Kahler

And because your work is engineering, your achievements will bring double satisfaction. Ask any real man what builds pride in accomplishment. He'll likely say: "Hours of hard work —plus an end result I can look at and call my own." The engineer's achievements fulfill this definition to a unique degree. His analysis of problems frequently carries him into the highest reaches of mathematics and abstract thinking—so high that most men can't begin to follow him. Yet days or months

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later he can look at a bridge, a radio transmitter, or a jet engine and say: "I helped build that."

Engineering is a distinctive and a proud profession. The prestige of an engineer is high. Other men are sometimes in awe of him. In some ways he's a mysteriously gifted builder of things they can't understand. Most engineers are secretly proud of their mastery of a language strange to the general public, and even to most educated people. The intricate terminology of engineering and its involved language of mathematics have a peculiar fascination to the initiated and uninitiated alike.

But don't make the mistake of trying to impress upon others your mastery of the integral, your knowledge of the mechanical efficiencies and the like. Your job will be to make your knowledge apparent through statements and illustrations so simple that anyone can understand. Recognition comes only when others understand what you have done—and they won't understand if they don't know what you're talking about.

Be Patient—Rome Wasn't Built in a Day

Two qualities above all distinguish the master engineer—a broad foundation of knowledge pertinent to his profession and a genuine enthusiasm for his work.

Let's look at each of these qualifications. A broad foundation in engineering is a lifelong process — one of continual growth. Formal education is only the beginning. Engineering schools do not make engineers, but they offer to those of good intellectual endowment a preparation in fundamental subjects of study—a survey of the fields of engineering—and a mental discipline that grows out of the process of analysis that engineers employ. These—accepted and used in a proper spirit—lay the groundwork for a successful engineering career.

But experience—long experience is necessary before one becomes an engineer in a true sense of the word. The broad knowledge and close judgment which are the marks of maturity come—and then only slowly—from practical application of engineering principles. Good engineering is a blend of the fundamental knowledge of the classroom with practical skill, with practical knowledge of a variety of subjects, and with the instinctive confidence that grows out of long experience in the job.

This continuing process of engineering education makes heavy demands upon the engineer. Viewed in perspective, engineering requires unusual technical, physical, and social qualities. While engineering students should not become **preoccupied** with the **purely** technical side of engineering, the demands here are high.

An engineer should have an analytical mind, capable of critically studying technical problems and arriving at their correct solution. This ability to analyze not only underlies all engineering procedure, but is frequently the reason why engineers excel in other fields of endeavor unrelated to engineering. It presupposes an interest in difficult and abstract problems and an inquisitive mind that seeks reasons for everything.

An engineer should also possess originality of thought and action. No practical engineering problem can fit an abstract standard. New factors and conditions are continually encountered which call not only for close analysis, but for objective thinking, and a willingness to take a calculated risk.

Don't Be "Cloistered" In Your Profession

On the physical side, an engineer should look to his health—and particularly to his nerves. Modern business life is a test to the most robust constitution. Most engineering jobs require steady nerves, and some of them require great physical endurance. The mining engineer has probably been more frequently selected by novelists as the paragon of rugged manliness, than any other occupation. Good health combines naturally with a neatness of appearance and dress. It's perhaps needless to add that good appearance and tasteful dress are as important to the engineer as to any professional man. It's often looked upon as outward manifestation of attention to detail—and in engineering as in most professions—if we take care of the details, the big things take care of themselves.

But the engineer does not deal with problems of force and matter alone. Engineering in all ages has applied as much to human beings and human lives as to mechanisms and natural phenomena. The engineer must know how to handle people—his colleagues, his co-workers, his clients, and in many cases the general public. He should have the ability to make friends easily and to make favorable first impressions. He should have a desire for companionship—particularly the companionship of his fellow engineers—but not to the extent that he becomes cloistered in his profession. He should develop his ability as a conversationalist. He should deliberately broaden his interests—not only to make himself a better engineer—but to make himself a better man and friend. And if he is to aim high in his profession—and reach his mark—he must develop—now, while he's in school — those qualities of leadership which are so essential to future success.

A Broad Foundation Is a Platform For Success

Turning back for a moment to the intellectual side of engineering preparation, another point deserves comment. We speak of engineers as belonging to different branches—civil, mechanical, electrical, chemical, industrial, mining and metallurgical, and so on. But in the actual practice of engineering, we seldom run up against defined frontiers. The various branches of engineering may be separated for purposes of study, and as a tool of teaching, this has a useful purpose.

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Why an Engineer?

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But in practice, they almost always overlap. As a practicing engineer, you will continually find yourself running into problems outside your own special field.

I say this from first hand knowledge because this was my first experience upon graduating from engineering school. I took my degree in mechanical engineering, but because the telephone industry appealed to me, I found myself working in the field of electrical communications. Just out of college and into a paradox—a mechanical engineer in an electrical business!

One of my first assignments was to work on what was then a comparatively new thing in the telephone business—dial switching equipment. This, as you know, is an electro-mechanical device. Working with it involves a knowledge and appreciation of both the electrical and mechanical engineering fields. I learned very shortly that regardless of which field I had specialized in as an engineering student, my work was forcing me to learn them both.

Hundreds of other engineers in the telephone business have had similar experiences. In recent years a large number of telephone engineers have faced another big problem of broadening their knowledge.

Twenty years ago, with the exception of our long wave overseas radio, and a few short radio links here in the States, the telephone industry operated entirely on the basis of wire circuits. An electrical engineer who chose communication as his major field specialized either in radio—which was wireless—or in telephone and telegraph engineering —which was wire communication. To a casual observer it looked as if a man in one of these fields had no reason for concerning himself with the other.

Today — only twenty years later — radio is well on along toward becoming a substantial part of our long distance telephone plant. Today telephone subscribers back east are already calling from New York to Boston over a seven station microwave radio relay link, and in the next few years scores of microwave telephone circuits may be added in other parts of the country—including long distance circuits from Chicago to the eastern seaboard.

Although we prefer to consider radio relay a form of telephone service, the energy that does most of the job is a radio wave. And the major problems involved in setting up and operating a microwave radio relay link run all the way from problems in terminating carrier telephone equipment to the design of directional radio antenna systems.

You see the point. The Bell System engineers who design, install and operate our microwave radio relay systems must be good telephone engineers and good radio engineers. We have men who are both—regardless of what their early specialized training was.

Now don't misunderstand me. I don't mean to imply that specialization is in any way disappearing from engineering. On the contrary, most engineering problems — considered individually — are highly specialized. But specialization, generally speaking, can be successful only after a broad foundation has been laid. Only then is the engineer qualified to handle these specialized problems. Only then does he have the broad background necessary to recognize the ramifications and relationships that lead into specific engineering phases. The broad background comes first; the successful specialization later—building on it.

There's another good reason why a broad background comes in handy for the engineer. Statistics show that over 50% of our engineering graduates are gradually promoted to supervisory or executive positions. Some become owners or partners in engineering firms; others enter the extremely broad field of business management. Either of these fields call for a background of great variety. In addition to technical engineering, the engineering executive or industrial manager must know the tools of management. A working knowledge of economics, accounting, labor problems, business law and business administration generally lays another very useful foundation for a promising start in engineering.

Your Studies—A Whetstone For Your Mind

Of course, a technical engineering education is itself an excellent aid to a career in business management. The average engineer who goes from the technical engineering phases of a business into its management always feels a touch of pride in the "think powers" he developed as an engineer. It's not that engineers as a profession are conceited about their mental attainments. But a close study of the physical sciences does develop systematic habits of analysis. A continuous association with the constants and variables of the typical engineering problem does seem particularly valuable in dealing with the highly dynamic and variable **human** situations which we meet in modern business.

There is a tendency in some quarters to belittle mathematics as a tool of intellectual discipline. I've even heard people say that the only thing mathematics trains you in is mathematics. I'm always skeptical of these people because it seems to me that in mathematical forms alone we establish some very exact patterns for human thinking. The equations with which we attack the masses of data in a physics problem, for example, involve the two elements which we encounter in many of our daily situations—the constants and the variables.

After all, mathematics is merely a method of arriving at values, and correct evaluation underlies correct decisions in any field. To reach the final answer on any problem we really go through a process that is essentially mathematical. We identify the constants, classify the variables, weigh the coefficients, and often solve for several unknowns. Human relations are full of variables and unknowns.

In any case, just **how** mathematics helps to discipline the mind is a theoretical question. The fact still stands, as a matter of wide observation, that engineers in management positions do make good logicians and often distinguish themselves in supervisory and executive posts.

The mathematical method of attacking everyday problems—be they technical, human or managerial—will serve you in good stead, and help to lead you to proper conclusions. But in reaching these conclusions, don't disregard the fact that when you are dealing with people, two plus two don't always make four.

So much for the preparation of the engineer's mind — the broad foundations of knowledge and interest he must build. But there is another phase of personal preparation for engineering that deserves attention—and that is forming the right attitude. I mean by that, the development of a genuine enthusiasm for engineering and engineering work.

Keep Your Inspiration "On Tap"

Most engineers—at least in the beginning of their careers—have a lot of spontaneous enthusiasm. But to be permanently inspiring, any profession must become more than a mere job. It should become a way of life.

Some engineers instinctively live their profession. They are so absorbed in their work that—without other embellishment—it becomes its own reward. But for the rest of us who tend to grow restless occasionally, there are several ways by which we can remind ourselves from time to time of the true greatness of our calling. These are ways of creating our own inspiration when our interest seems momentarily to have become dulled. I'll touch on one or two.

First, you may read with both intellectual and emotional profit the history of engineering in any branch. Second—and by the same token—you can find inspiration in the biographies of the great engineers. Third—and perhaps the most important—you can draw both inspiration and useful knowledge from the fellowship of other engineers.

The history of engineering includes much of the story of human progress. Beyond that, it eloquently testifies to the ability of engineers in the long run to develop methods for solving almost any problem of man in relation to physical nature.

Who, for instance, can escape fascination in reading how the engineers of Ancient Egypt—with only primitive machines—carved, transported, and erected those great monuments to engineering that still stand in the Nile Valley? Can any civil engineer read, without a thrill of pleasure, of the great march of the early engineering art—from the roads and aqueducts of ancient Rome down to the lighthouses that brought safety to the coast of England in the nineteenth century?

Since the industrial revolution and the arrival of modern engineering and engineering problems, the inspirational qualities of engineering history have multiplied a thousandfold. Today, **in your own branch of engineering,** there is an inspiring story of challenges and answers—of knotty problems and their difficult solutions—of baffling nature and determined men. Out of these records of the past—inspiration for the present **can** be born.

To look back on that progress —or even on the progress each of you here has observed in your own short years of youth—it is apparent that the end of fundamental knowledge is not yet here. Obviously there is much to be done and much that can be done —unknowns to be made known —and vast technical regions to be explored for the betterment of society. There are opportunities galore—if each of you will seize upon them for the common good. All that is required is a little ingenuity, a little more courage, and a lot of plain dogged hard work—all of which constitutes a simple formula easily applied if the state of mind is correct.

Kindred Spirits Make Good Company

But all work and no play makes Jack a dull boy. You will need fellowship and relaxation, too. If you can get it in an environment that is familiar to you, it will pay off doubly. So, in seeking it, don't overlook fellowship with your brother engineers. From fellowship with them, you can draw many of the things that are so essential to your growth in the profession. They can give you counsel. They can share with you their experiences. They can supply you with useful knowledge of engineering fields other than your own. Above all, they can raise your hopes and efforts to greater heights than you ever dreamed of—through the force of their example.

There are many ways in which you can share in a large measure the fellowship of your brother engineers in all fields. For some, this may be done through one of the several national engineering fraternities. But there are two ways in which all engineers can reap benefits in this field.

One way is through your engineering college alumni association. You gentlemen of the Illinois Institute of Technology are fortunate in being able to affiliate—upon graduation—with one of the most active and alert engineering alumni organizations in the country. Do this—for the services and fellowship of your alumni organization will pay you big dividends in the long run.

Why an Engineer?

(*Continued from Page* 15)

The second way brings me back to my opening remarks this morning. I noted that this gathering was under the auspices of a student branch of a leading professional engineering society. Membership in such an organization is a good sign that an engineering career is off to the right start.

After graduation from an engineering school, every engineer should become a member of at least one professional engineering society. There he will find the much needed forum necessary for the exchange of ideas, a ready means for keeping him up-to-date on a broad front, and the opportunity for the engineering fellowship that is so essential to the daily grind.

Here in Chicago, for instance, and throughout much of the middle west, the Western Society of Engineers stands ready to provide engineering fellowship and an active interchange of information—as well as the unequalled reference facilities of the John Crerar Library. In the meetings of societies like this one—and in their publications — is one of your finest opportunities for broadening your horizon in engineering.

An engineer is more than a designer, a researcher, or an expert on construction and operation. He's a man. Men from time immemorial have benefited most of all from their association with kindred spirits. By all means strive for technical excellence. Now while the time is most opportune, lay the broadest possible foundations for an engineering future. But in addition, strive for the widest possible communion with your profession. In the pleasant hours you spend with your fellow engineers from all branches of engineering—and in your occasional contacts with the great engineers of the past — are some of the richest treasures of your chosen profession.

Construction

(*Continued from Page* 5)

Perhaps the most significant development in the construction industry in many years is the broad scale of programs of cooperation on a nation-wide scale by the industry associations and professional societies to concentrate the experience and the best thinking of all segments of the industry on practical methods of solving the problems confronted. For its own continued prosperity, the industry must constantly give increasing value to the public for its investment in construction. If the industry, in Chicago and the rest of the nation, is to fulfill its part, its work must be done as rapidly, efficiently and economically as is consistent with quality.

Following the turmoil of the war and immediate postwar years, there now has become available the opportunity for all parties of the construction industry to give critical examination to all its operations, practices, procedures and inter-relations to see how these can be improved to the end that the industry serves the people better.

It is gratifying to observe that the American Institute of Architects and the American Society of Civil Engineers, through the Associated General Contractors of America, many of whom are members of Western Society of Engineers, are working together making a study of their mutual problems. In this manner, examination has been made of the procedures involved in competitive bidding on building and related construction. What is known as the "Suggested Guide to Bidding Procedure", has been developed as a means of recommending how construction costs can be held to a minimum through proper bidding procedures.

A continuing joint cooperative committee of the AGC and the Associated Equipment Distributors is at work on matters of construction machinery. In cooperation with the National Safety Council, various construction associations are at work perfecting programs which will prevent accidents on construction jobs, and apprentice training is being stimulated and carried out in work with the international unions and the Bureau of Apprenticeship.

Such matters as the clarification of the wording of contract documents; standardization of design to reduce the number of forms to be built; modernization of specifications and the revision of bidding and administrative procedures may not sound of importance, but their improvement means that the purchasers of construction will get more efficient and economical performance. The industry has a responsibility, in the next few years, of wide importance. The manner in which it is undertaking the solution of its own problems gives assurance that it will execute its work and discharge its obligations with skill, integrity and responsibility.

It must be conceded that the earnest endeavors which the building industry is devoting to the betterment of its procedures, belie the charges of archaism and backwardness to which it has been subjected. Even casual observation should reveal progress in every element of the industry — labor, site organization, operating methods, material supply and distribution. There is every evidence that such progress will continue and that constantly improving adaptations will be made to meet the constantly changing requirements with which the construction industry is confronted.

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The Engineer
IN CIVIC AFFAIRS

A Symposium
Sponsored by the Civic Committee, Western Society of Engineers
at Midwest Power Conference in Chicago on April 9, 1948

Telegram from
MARTIN H. KENNELLY, Mayor of Chicago

Mr. Herman Halperin
Chairman, Civic Committee
The Western Society of Engineers

I regret that it is not possible for me to be present and participate in the conference, "THE ENGINEER IN CIVIC AFFAIRS" sponsored by the Civic Committee of The Western Society of Engineers.

Members of this organization are taking an increasingly important part in all technical matters affecting the city. Their expert advice and counsel constitute an exceedingly valuable contribution to their city's government.

As Mayor and in behalf of the people of Chicago, it is a pleasure to express our deep appreciation and thanks to the membership of the Western Society of Engineers for their active interest in civic affairs. Congratulations and best wishes for a most profitable meeting.

Martin H. Kennelly, Mayor

Address by
HENRY T. HEALD
President, Illinois Institute of Technology

In a few short years, American scientists and engineers, working within the structure of a free society, have produced the highest standard of living the world has ever known. With only one-sixteenth of the world's people, America produces one-third of the world's goods. Through their technical competence and administrative skill, engineers have played a major part in making this possible.

Today engineers and scientists occupy a higher place in public esteem than ever before. The general public may have no clear understanding of the way we do our work or the principles which we use, but they do expect a continuous flow of new inventions and better manufactured products—probably and preferably at less cost. They will be surprised only when we fail to produce them.

Engineering is still a new profession. Some may even question whether it is really a profession at all. Yet it has attained many of the elements of public recognition—one of the characteristics of any particular group which gains certain privileges through its special competence in serving the public welfare.

Quite properly the Engineers' Council for Professional Development and many of our engineering societies have given a good deal of consideration to professional recognition. All of us seek recognition, and we have a conviction that the professional status of the engineer will be improved by proper

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Address by
S. M. DEAN
Chief Engineer of the System, Detroit Edison Company
and
Chairman, Civic Affairs Committee, The Engineering Society of Detroit

Introduction

Citizens everywhere are concerned over the state of public affairs. In the aggregate public affairs constitute a business greatly in excess of any single private industry and have a much greater effect on our economic and social well-being.

There is a growing feeling among engineers that they should be doing something about it by taking a more active part in governmental and public affairs, but in most cases how to go about it is not at once apparent. My purpose here today is to bring to you some of the experiences of a group of engineers which has been taking an increasingly active part in such affairs and to indicate to you the pattern which seems to be evolving as we go along.

Background

First, let me paint in a little of the political and practical background to lend perspective to what I have to say later.

The first requirement is that we rid ourselves of the commonly held opinion that governmental agencies, and particularly politicians, are per se a no good lot. The role of the legislator or public official is not an easy one. One need only attend their deliberations to realize that they are called upon to

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DETROIT PUBLIC LIBRARY

Address by Henry T. Heald

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recognition from his fellows and the members of the general public.

We have established standards of competence for membership in our engineering societies because we want our profession to include only those of demonstrated competence. State laws passed at our insistence protect the public and safeguard the profession.

Engineering is not a rigidly defined profession and probably never will be. The engineer's work places him in a variety of occupations. Studies made by the Engineers Joint Council provide an example. These studies showed the following distribution of engineers by occupational status:

Administration and management	40.0 per cent
Design, research, and development	32.6 per cent
Manufacturing and production	9.6 per cent
Consulting	8.0 per cent
Teaching	4.7 per cent
Sales	5.0 per cent

In a democracy every citizen has a moral responsibility to participate in government. Engineers share this responsibility with others. They are obligated to use their intelligence in arriving at sound decisions which will determine government policies and hence the future of the republic.

There is no reason to believe that engineers are endowed with any special qualities which will provide easy answers. When they design structures, machines or mechanisms, they can usually arrive at definitive answers and quickly demonstrate the validity of their conclusions. Agreement is not so easy on the complex social, political, and economic problems of our time. Yet the stakes are infinitely higher.

Some of this civic participation can and should come through our engineering societies. Increased activity by professional groups both locally and nationally is encouraging. However, more of it must come through participation not as engineers but as citizens.

Engineering is an exacting profession. The demands on a man's time and energy are very great. **But somewhere—somehow—we must find the time and energy to understand and to participate in civic affairs, in politics, and in the framing of public policy.**

Consider, for instance, some of the major national issues which we face today:

International relations with Russia: Can a capitalistic democracy survive in a world dominated by communism? How can we eliminate suspicion and misunderstanding and tension? What can we do to preserve the peace, won so recently by the sacrifice of untold millions?

These are searching questions. They demand straight analytical reasoning, based on fact, which scientists and engineers—perhaps better than any other group—can supply.

A second national issue is **European recovery.** Slightly less than a year after it was proposed by Secretary Marshall, we have embarked upon the largest peacetime program of overseas expenditure ever undertaken. The war's arsenal of democracy has became the peacetime treasury for a good share of the world. Will these dollars do the job? Is our objective clear?

What about **national security?** The President has urged the adoption of immediate legislation to resume the draft and set up a program of universal military training for our youth. Will these provide national security? If the draft is revived, are we not likely to repeat the stupid mistakes of the last war which resulted in a great depletion of our supply of badly needed scientists and engineers?

Federal aid to higher education and research is another question of great importance these days—closely allied to that of national security. We in higher education believe that we offer two distinct services to the public which supports us—the first, education; the second, research. These services cannot be performed without funds. And one of the great providers of such financial support is the federal government.

When the government foots the bill, it also must necessarily exercise a measure of control. And control of these functions stifles freedom of academic and scientific inquiry.

These are questions which cry for solution. An ostrich attitude of inaction will net us nothing. Neither will impulsive action based on inadequate thought or insincere motives. Why cannot the engineer lend his talents to these problems? Why cannot he give them the impassionate consideration he applies to the problems with which he is daily confronted?

Most of us feel we are not too well prepared to solve these problems, yet they must be solved. Others with even less qualification will do it for us unless we are prepared to help. We must get the facts, analyze them, and reach sound conclusions. The decisions made now will determine the future and everyone's place in it.

Most engineers find it difficult to run for office; they must make a living, and, even if they are elected, they find it difficult to pick up the threads of professional life after serving. Many men—not engineers alone—refuse to take the personal punishment to reputation and pride which generally accompanies election to public service.

But all can vote. All should and must vote. Registration for voting and regular appearance at the polls are duties no serious-minded citizen can afford to ignore. It's a sad commentary, indeed, that many of the most voluble gripers about men and events in public life are those who never take the trouble to cast a vote.

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Address by S. M. Dean

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exercise judgment in a range of situations almost as wide as human endeavor. They are under constant and confusing pressures from the several departments of government affected, from the press, the radio, the public letter box, and other pressure groups. Unfortunately, those agencies are almost never in agreement on any subject so the representatives of the public do just what you and I would do—they turn to someone who has experience in the situation in question and in whose integrity and judgment they have confidence to help them get a clear and, if possible, a simple picture of the situation. **And that is where the public-spirited engineering group comes in.** If they can make the acquaintance of the public's representatives and executives and can by helpfulness gain their confidence, the group will be on its way toward exercising a real influence in public affairs.

It is in this process that the general engineering society of a region has much to offer. In the first place, it comes as near to having "no axe to grind" as any citizen group. Also, it can have available in in any situation a wide range of engineering talent and ability; whereas, the Professional Societies themselves are limited to one special group. That is a very real advantage.

The Naive Engineer

We used to think that all a group of engineers need do was to prepare a broadly worked-out engineering analysis and that it would, of course, receive immediate acceptance, and that everything would fall into its proper place and "click". Well, 'tain't so! Some pressure group or governmental agency or some politically prominent individual may find that your recommendations run counter to its wishes and from that direction you may draw a "Bronx Cheer."

This means that we as engineers must sell ourselves to the elected and appointed public representatives. If we are to take any real part in public affairs, it will be necessary to assume a tolerant and understanding attitude toward persons in government employ and to broaden our understanding of how public matters are really handled.

Some Specific Cases

In this matter, I came up through the Civic Affairs Committee of The Engineering Society of Detroit. The Committee has been active in this field for nearly ten years. I won't recite all the details in the several matters on which the Committee undertook to be helpful; however, we were of assistance in the following matters:

1. Selection of parking meters.

2. Eliminating public protest against its garbage incinerators.

3. Formation of the Detroit Metropolitan Aviation Authority which is now in effective operation.

4. Passage of an effective smoke ordinance.

5. Drafting codes for steam boiler operation, and for the installation and operation of refrigerating equipment.

6. Now studying the economic soundness of using salt to de-ice streets.

7. Cooperating with the City Plan Commission on the development of the City Master Plan.

8. Several years ago, the Committee became activity interested in the question of public transit, and it is about the results of this activity that I wish to speak in some detail because from it seems to be developing the pattern by which engineers may take a proper and effective place in public affairs.

As a result of its interest in the work of the City Plan Commission, the Civic Affairs Committee became convinced of the prime importance to any master plan of an adequate public transit system and urged the City to secure the services of transit engineers accustomed to dealing with large transit operations. Other citizen groups joined us and in a year or so, through a Transportation Board set up by the Mayor, such a plan was prepared. Unfortunately, because that plan was not worked out in full cooperation with the interested public and private agencies, its scope and cost were such as to cause considerable concern to the public and to the agencies not consulted. As a result, the Mayor asked the Department of Street Railways to prepare a public transit plan. The DSR plan was originally based entirely on gasoline buses using the proposed depressed expressways as right of way for express buses and building four large downtown underground bus terminals to relieve street congestion there.

After careful study of the DSR all-bus plan, the Engineering Society felt it to be grossly inadequate for the future needs of Detroit and so advised the Mayor and the Council. It was used as election thunder and the City Council approved the purchase of large number of buses, and were proceeding with parts of it. Accordingly, the ESD analysis of the plan and recommendations were pigeonholed. Then, the ESD decided to force the consideration of its analysis and alternate proposals, and released its report to the newspapers. As a result, the City Council set up a committee to review the entire transit situation, but it was suppressed by the City Administration and later disbanded. By that time, another City election was approaching and the

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Address by Henry T. Heald

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All engineers can and should participate in community groups, serve churches, schools, hospitals, and libraries, and take part in community drives, programs, and other affairs. The nation's strength begins and finds its greatest expression and opportunity for self satisfaction and accomplishment at the grass roots.

You can accomplish a great deal more through your associations with other citizens. This country's engineers can exert a tremendous influence for civic good if they mobilize for the task. Here is a great additional opportunity for service in the best tradition of the profession.

Statement by

SENATOR RALPH E. FLANDERS

Read at Meeting

The engineer can bring to public service and civic affairs certain qualifications which are natural to his education and experience.

It is often assumed that one is a liberal or a conservative in accordance with the nature of policies or laws which he supports. For example: Any law or policy which handicaps public utilities or railways or large industries is supposed by that fact alone to belong in the "liberal" category and the assumption is that it should therefore have the support of every conscientious citizen.

The better way of looking at this is to suggest that there can be liberal objectives as distinguished from reactionary objectives. Certainly one of the liberal objectives would be to make it possible for our society to so develop that the great increases in production of material goods and personal services are more broadly distributed through the whole population on the broad basis of willingness and ability of the recipient to do his share of the work of that society.

Another liberal objective would be to work, not toward equality of income or equality of wealth, but toward equality of opportunity.

The ways of reaching these social objectives should not be classed as liberal, radical, conservative or reactionary. We should judge these ways and means by two simple criteria: Are they honest? Will they work? Measures judged by these criteria may be favorable or unfavorable to utilities or large industries; that makes less difference than does the contribution they make toward attaining the objectives.

The citizen with engineering training is particularly competent to pass judgment on measures and policies as to whether or not they will work. He can forget the labels popularly attached to them and concentrate on the question of effectiveness. In so doing he will help to fill a great and unfilled need in the carrying out of the civic responsibilities of our people in our time.

Address by S. M. Dean

(*Continued from Page* 19)

single engineer member of the Council, who had held out for an adequate transit system, ran for Mayor largely on the transit issue and was elected. Also, the six new Councilmen (out of nine) were very transit conscious.

Just before the Mayor and the new Council took office, the Engineering Society invited them to a dinner followed by a presentation by its Civic Affairs Committee of the whole transit picture. That presentation was very well received, and, when the new Mayor, Mr. Eugene I. Van Antwerp, took office, he replaced the DSR Commission. A new Commission was appointed with instructions to proceed toward a rapid transit type of system making all reasonable use of electric traction. He recommended reviving the Rapid Transit System as provided in the City Charter. The Rapid Transit and the DSR were to cooperate on an adequate system.

Your speaker, having been the active sponsor of the ESD transit program, was appointed a member of the DSR Commission and selected as its President. As a direct result of having talked too much, he now finds himself in a substantial measure responsible for the City's present transit system and perhaps for the formulation of a new and more adequate transit general plan.

This experience to my mind illustrates the process by which engineers can and should take their proper place in government. It is not easy. It requires sustained hard work. The cost to the man is high, but the prize is an opportunity to correct some of the evils of which we all are so much aware.

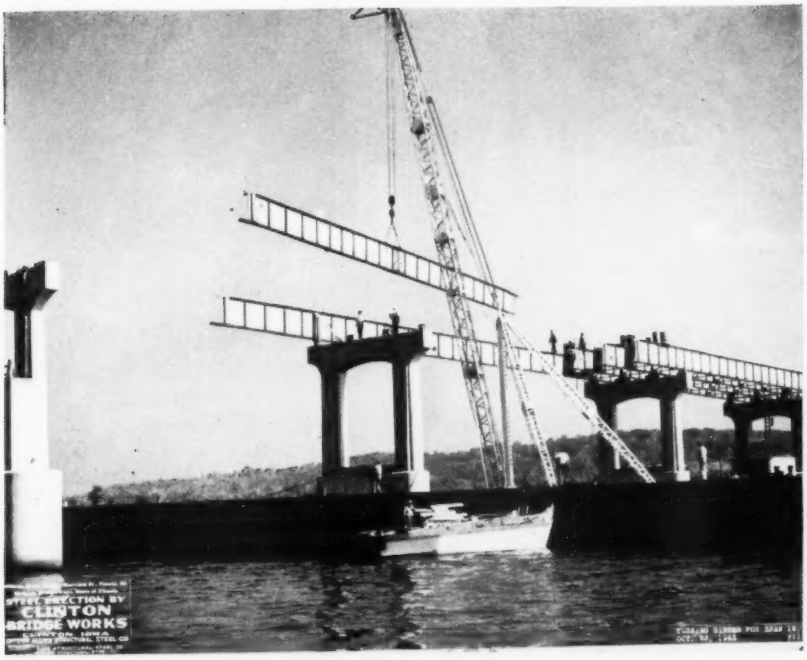
Up to now, I have spoken mostly of the experiences of our engineering group in civic matters, but I also want to say a word about some of the other public problems in which engineers might well give attention.

High among these is the question as to how the great metropolitan centers can carry the economic burden of the increasing facilities and services required for modern urban living. A full and unsparing analysis of this very fundamental question is needed as a guide to public expenditure.

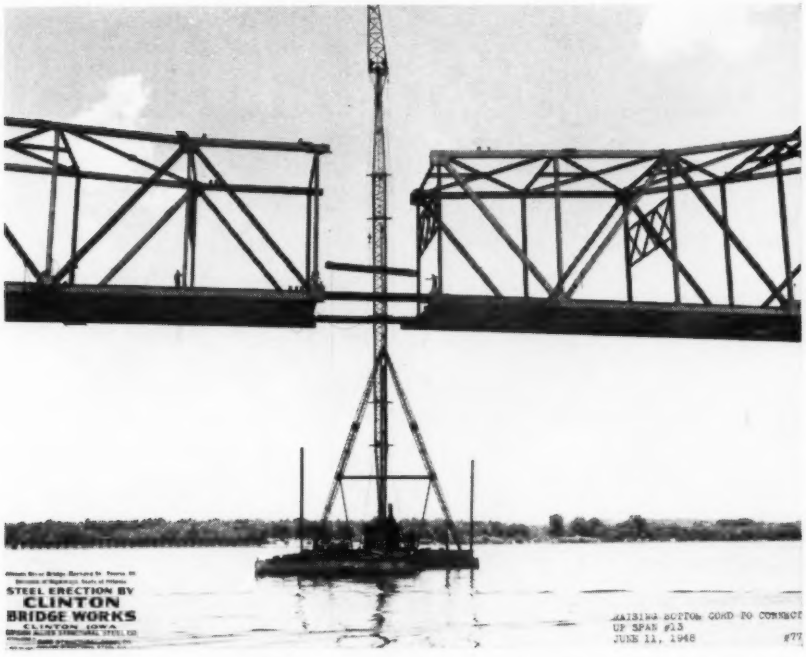
Closely related is the problem of the economical operation of governmental agencies. There are outstanding examples of smaller cities that have put their affairs in economical order with marked reductions in taxation.

The problem of collecting and disposing of a city's waste materials—garbage, combustibles, metals and glass, sewage, storm water, and the like—merits some very fundamental and far-reaching study.

In addition to these general questions, every community has its special public problems toward the solution of which engineers can and rightly should lend a hand. If you would know what they are, attend the meetings of your city council and your city plan commission as well.



Allied erecting crews turning girder for Span 19 of great Harvard Street Bridge crossing Illinois River at Peoria.



Allied erecting crews raising bottom cord to connect Span 13 of giant Illinois River Bridge at Peoria. Major part of erection was handled from the water.

Floating Barges Used in Erecting New Peoria Bridge

Derricks, Pontoons Raise Peoria Span

An unusual time-saving feature was used by the Allied Structural Steel Company in erecting the 4,745-foot Harvard Street Bridge at Peoria, Illinois, shown on our cover.

The Allied erection unit used floating equipment to handle most of the erection work from the water, according to John F. Beasley Construction Company. The 28-span beauty is now nearing completion.

Instead of inching steel units over newly laid structural, Allied engineers conveyed fabricated steel members to the proper location by barge, placed them in position by derrick. Derricks and hoists were supported on steel pontoons. The steel members — some weighing up to 18 tons — were swung into place by special crane equipment.

Seamules were used to pull the heavy laden barges from place to place. Derrick floats and equipment were moved from one side of the bridge to the other in five minutes' time, engineers stated.

The entire Harvard Bridge erection project is under the general supervision of Clinton Bridge Works, the Iowa division of Allied Structural Steel Companies — Cooperating with the State of Illinois Division of Highways.

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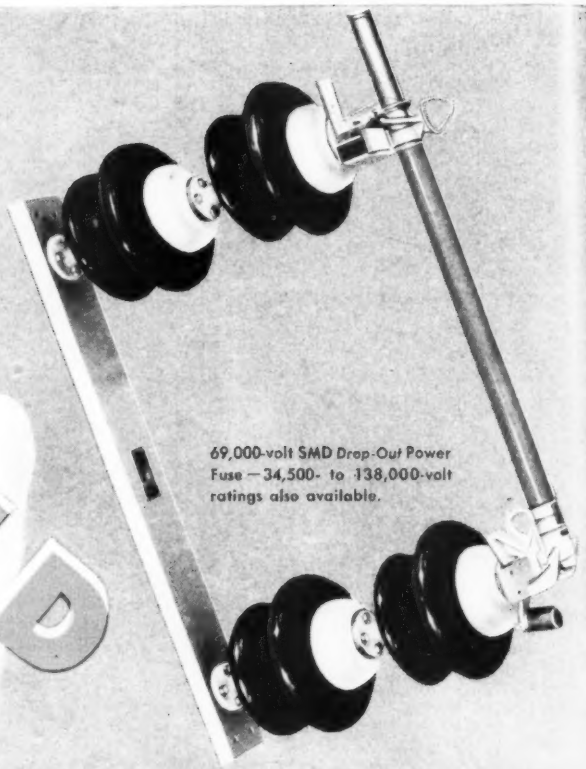
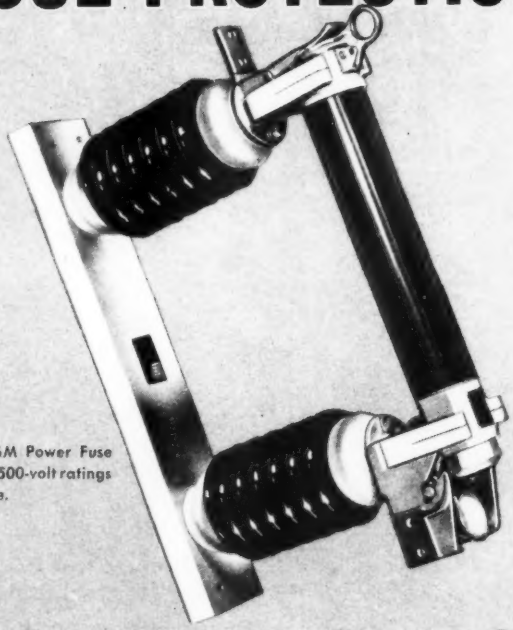


69,000-volt SMD Drop-Out Power Fuse — 34,500- to 138,000-volt ratings also available.

FUSE PROTECTION



23,000-volt SM Power Fuse —7,500 to 34,500-volt ratings also available.

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ESSENTIALLY, primary fuses are applied for primary protection, but... because no other make of fuses can provide it... the belief is too commonly entertained that secondary-fault protection has no part in primary fuse application. This is to miss an opportunity to take preventive measures against transformer burnouts in case of faults at the secondary terminals and in case of failure of secondary protective equipment to clear short circuits.

Actually this desirable twofold fuse protection can be secured because S & C's SM and SMD Power Fuses are designed for *full coverage**, and therefore include these notable features:

1. Positive means and ability to interrupt the lower values of primary current developing during secondary short circuits.

2. Definite means and ability to cope with the severe recovery voltage often accompanying the interruption of short circuits on the transformer secondary.

3. "Non-damageable" fusible element that precludes "sneak-outs", and therefore permits primary fusing with ampere ratings sufficiently close to the transformer load current to function on secondary short circuits; also provides permanently accurate time-current characteristics, so important in close coordination practice.

These are the particular essentials of fuse design and operation required to obtain secondary fault protection of the type described above to supplement the ordinary functions of a fuse on primary applications. When designing your own, or ordering factory-built substations, be sure to get this *twofold* fuse protection—specify SM or SMD Power Fuses.

A term adopted to call attention to the importance of considering* ***all* *the conditions under which a fuse may be called upon, or may have the ability, to operate dependably.*

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Western Society Applicants

In accordance with the By-laws of the Western Society of Engineers, the following names of applicants are being submitted to the Admissions committee for examination as to their qualifications for admission to membership into the Society in the various grades, i.e., Student, Junior, Member, Associate, etc.

All applicants must meet the highest standards of character and professionalism in order to qualify for admission, and each member of the Society should be alert to his responsibility to assist the Admissions committee in establishing that these standards are met. Any member of the Society, therefore, who has information relative to the qualifications or fitness of any of the applicants listed below, should inform the Secretary's office.

12–80 Gail L. Miller, Asst. Sewer Designer, City of Chicago, Dept. of Public Works, 188 W. Randolph St.

13–80 James C. Daley, Pres., Jefferson Electric Co., Bellwood, Ill.

14–80 Joseph Caldwell, Jr., Section Engr., Jefferson Electric Co., Bellwood, Ill.

15–80 L. Mauerer, Vice Pres.—Engng., Jefferson Electric Co., Bellwood, Ill.

16–80 Roy J. Horstmann, Asst. to Chief Engineer, Jefferson Electric Co., Bellwood, Ill.

17–80 Edmund R. Schmidt, Engr., Illinois Bell Telephone Co., 131 N. Franklin St.

18–80 Wilbur L. Snook (Rein.), Supt. Gas Production, Public Service Company of Northern Illinois, 72 W. Adams St.

19–80 William J. Lang, Step-by-Step Maintenance Engr., Illinois Bell Telephone Co., 212 W. Washington St.

20–80 Robert G. Armstrong, Machine Design Engr., Coleman Co., Inc., Wichita, Kan.

21–80 Robert J. Hughes (Trsf.), Student Engr., Illinois Bell Telephone Co., 212 W. Washington St.

22–80 John A. Corboy, Pres., M. J. Corboy Company, 405 N. Desplaines St.

23–80 Carl G. Bergstrom (Trsf.), Engr. Arch'l., Illinois Bell Telephone Co., 212 W. Washington St.

24–80 Edward H. Wachs, Secy. & Asst. Gen. Mgr., The E. H. Wachs Co., 1525 Dayton St.

25–80 Thomas E. Nicholas, Struct'l. Engr., Leonard Engineering & Construction Co., 37 S. Wabash Ave.

26–80 Orestes B. Johnson, Jr. (Trsf.), 5852 S. Michigan Ave.

27–80 Robert W. Brinker (Trsf.), Design, Develop & Layout of Spec. Mach'y., Illinois Tool Works, 2501 N. Keeler Ave.

28–80 John Gray (Trsf.), Sales Mgr., Associated Research, Inc., 231 S. Green St.

29–80 Miss Clara E. Lawrence, Corp. Secy. & Assist. Corp. Treas., William B. Lucke, Inc., 514 E. Railroad Ave., Wilmette, Ill.

30–80 Mary Ann E. Crawford, Arch. (Own Practice), 2450 W. Hubbard St.

31–80 Henry M. Szypulski (Trsf.), Jr. Engr., Corn Products Refining Co., Argo, Ill.

32–80 Harvey M. Burhop, Sales Engr., Mississippi Valley Structural Steel Co., Melrose Park, Ill.

33–80 Carl H. Poedtke, Safety Engr., United States Fidelity & Guaranty Co., 170 W. Jackson Blvd.

34-80 Cecil O. Bernard, Safety Supervisor, United States Fidelity & Guaranty Co., 170 W. Jackson Blvd.

35–80 Maynard A. Cook, Partner, Sloan, Cook & Lowe, 120 S. LaSalle St.

36–80 John M. Roberts (Trsf.), Engr.-Equip., Illinois Bell Telephone Co., 212 W. Washington St.

37–80 Edward G. Schnetzler (Trsf.), Engr., Illinois Bell Telephone Co., 212 W. Washington St.

38–80 Joe Umeda (Trsf.), 312 S Street, Sacramento, Calif.

39–80 Carl J. Pudewill, 5533 S. Everett Ave.

40–80 Donald H. Reisse, Draftsman, Battey & Childs, 231 S. LaSalle St.

41–80 Alfred R. Moberg, Jr. (Trsf.), 1904 S. 22nd Ave., Maywood, Ill.

42–80 Howard W. Olsen, Jr. (Trsf.), 5515 N. Major Ave.

43–80 Merel Meyer, Teaching Various Engrg. Drawing Courses, Chicago Board of Education, 226 N. LaSalle St.

44–80 Theodore L. Bucuvalas, Draftsman, Babcock & Wilcox Company, 5 S. Wabash Avenue.

45–80 Charles Macklin, Private Practice as a Structural Engineer, 206 S. Fourth St., Springfield, Illinois.

46–80 Theodore J. Adams, 570 S. School St., Lombard, Ill.,—attending Illinois Institute of Technology.

47–80 Andrew C. Dunn (Trsf.), Chief Engineer, Catholic Cemeteries, 109 N. Dearborn St.

48–80 William A. Ghiselli, Jr. (Trsf.), Mach. Designer, Caspers Tin Plate Co., 4100 W. 41st St.

49–80 William T. Reace, Vice President, Commonwealth Edison Co., 72 W. Adams St.

50–80 John A. Dienner, Partner; Brown, Jackson, Boettcher & Dienner, 53 W. Jackson Blvd.

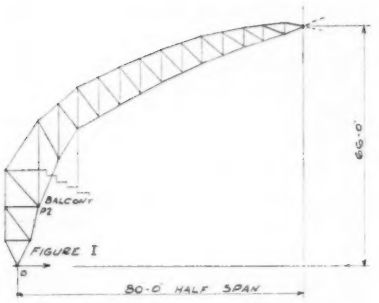
51–80 William L. North, Velocity Steam Engr., Velocity Steam Production Engineering, 38 S. Dearborn St.

52–80 LeRoy F. Slivinski (Trsf.), Assist. Mech. Engr., D. A. Stuart Oil Co., Ltd., 2727 S. Troy St.

Engineering Problems

IN BUILDING CHANGES AND REPAIRS

F. H. Wells*

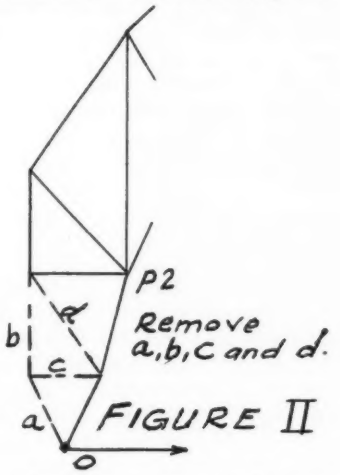


Before the recent face lifting and lobby alterations of the Chicago Coliseum were undertaken, I was taken to the site and asked "Can it be done?". No self-respecting engineer will say that a thing cannot be done, until he has at least made an honest effort to do this particular job. On the other hand, it might appear presumptuous for him to say that it could be done when he had never seen anything just like it before.

What was this alteration that appeared to be so unusual? The roof construction of this building consisted of three-hinged arches about 25 feet apart and steel purlins about 8 feet apart supporting the roof slab. The arches had a span of 160 feet and are as indicated in Figure I.

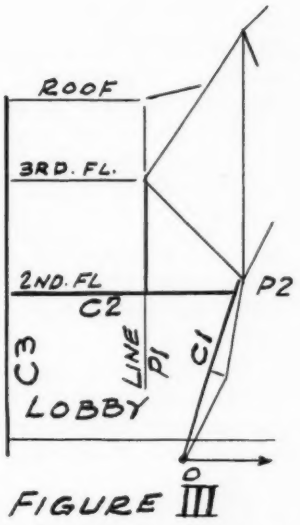
The problem was to remove certain members of the arch truss to provide for an enlarged lobby. Figure II shows the amputation necessary on the arch to get the desired additional space, members a, b, c and d to be removed. When the work was being performed it was found that member "d" need not be removed.

At first examination the thought of such a thing appeared to be fantastic. However, by diagrammatically showing the whole new lobby, second floor, third floor and roof, along with the arch truss, a frame suggesting a possible solution took form. Figure III shows the members removed and the general arrangement of new members to provide for the resulting unbalanced forces. Member C1 is a member to relieve the dog leg action in the inner chord of the arch. C2 is the new second floor beam which also provides for the resulting unbalanced vertical forces at line P1. The reaction from member C2 constituting a new force on the arch at P2 was a relatively small force. Under certain conditions of arch loading the resultant force at P1 was upward by a small amount. The outward force at P2 is transmitted through the second floor beam to new column in outside wall (C3) which is tied back to arch with a beam at the third floor and a new tie rod at hinge O.



Members C1 and C2 were made of two pieces each, so that they could be erected, one piece each side of the arch. These members and the new steel of the lobby section were erected, with connections made to inner and outer chord members before cutting the members to be removed.

The investigation and design procedure followed was to first determine the stresses in the truss members due to roof dead load, wind forces both directions, and balcony loads and new construction loads, without regard to alterations, then by combinations of these stresses determine the unbalanced forces at the points where members were to be cut, then insert new members to provide for these unbalanced forces.



There were two advantages in proceeding in this manner, rather than placing the critical forces in the final form and determining the stresses directly: (1) the stresses in the arch because of the regular arch loading could be determined and tabulated before the final lobby design was completed, and (2) the number of loading conditions was reduced.

The problem, of course, required determining and tabulating stresses for the various loading conditions as in any new design, and providing for the forces left where members were out. This did not prove to be particularly difficult.

The framing of the lobby section and the fact that the stresses in the outer chord members were low made this solution practical. The only difficult

(Continued on Page 26)

*Consulting Engineer

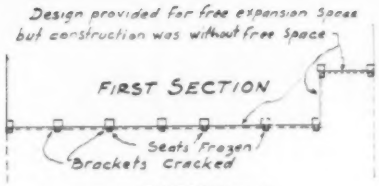


FIGURE IV

(*Continued from Page 25*)

part of the work was to determine the actual layout and design at the site, because drawings of the existing design were not available.

The practicability of this solution could scarcely be determined until the whole procedure was analyzed.

Very often, an engineer is asked whether a certain alteration or a design made under certain restrictions is feasible. To answer the question with anything more than a yes or no is frequently more difficult, and requires more engineering skill and judgment, than to carry out the design.

This is an important service to a client, and the engineer should not hesitate to emphasize it in his dealings with a client or prospective client.

In executing a design for structural alterations where existing loads are to be transferred to new members it is obviously desirable from an economical standpoint to arrange the new members so that the loads can be transferred by direct connections before removal of existing supports, thus eliminating the necessity of shoring where possible. In many instances shoring can be entirely eliminated, or limited to those cases where it is necessary to reduce stresses or deflection at the time loads are transferred.

A willingness to be hasty in answering questions of feasibility does not necessarily represent great ability, but on the contrary may indicate a weakness and lead to embarrassment.

Another phase of alteration work is that which is brought about by discoveries of weakness in existing structural members made after exposures at the site, in clearing away for the original work contemplated. In reviewing such cases it is hardly proper to give names of building because fear might be aroused as to undiscovered weaknesses, owners might claim damages for such statements, and for other reasons. However, a general discussion of these may be of interest.

Building A was a six story reinforced concrete building 25 years old (built about 1913). When the basement was cleared away for routine work such as interior remodeling and decorating, cracks were discovered in several columns. These were vertical cracks across the corners of the square columns and extending from the ceiling downward about twelve inches. A light blow with a hammer would remove this section of concrete and expose the corner reinforcing bar. Examination disclosed that the bar, in some instances, was displaced outward by as much as one eighth of an inch. Further examination showed that no lateral ties for the vertical bars had been installed. Reinforcement was provided by installing a complete new spiral around the basement length of column.

Building B was a reinforced concrete, flat slab warehouse of eight stories. The columns were twenty feet center to center except in one section where the outside wall was placed three feet outward for an exterior design effect. The span here was twenty-three feet. What was observed was a crack (structural) in the bottom face of slab parallel to outer wall and about five feet in from this wall, and a measured deflection of one and one quarter inches. Further examination showed that at the line of this crack the reinforcing steel was three and one half inches above bottom of slab. The reinforcing steel, when placed, was bent at the site. This was a clear case of necessity to provide additional supports from the ground up.

Building C was a reinforced concrete warehouse eight stories high with provision on one end for lateral extension. This extension was provided for by casting brackets on the exterior side of the columns along this line. See Figure IV. The building was seven bays wide but was built with the corner bay on one side set back one bay in length. When the new extension was built, provision was made in the design for an expansion space between the old and new work and also for free sliding on the bracket seats. Neither of these provisions was carried out in construction. While the main consideration in design seemed to be for free longitudinal movement, the feature which was the real damaging one was the restraint laterally because of the lapped corner of the new section and contraction pulling eccentrically against the brackets tearing them away from the columns. Here again was a case for new supports from the ground up.

Building D was a mill building 80 feet wide and 350 feet long with Fink trusses, steel purlins and corrugated steel enclosure. The roof was to be raised 11 feet and the walls were to be made new of brick and glass. This was during World War II and the building was to be used for refining and casting aluminum. It was difficult to obtain steel so it was necessary to use as much as possible of what was there. It was found that the trusses could be raised and continued in use (with some reinforcements) but the columns were inadequate in size for the added 11 feet in length and some were also rusted and bent. New columns were used throughout. A general idea of the conditions of the original design can be found in the fact that examinations made at the site showed some of the angles connecting kneebraces to columns were bent

as much as 10 degrees—indicating that insufficient provision had been made for wind forces. If the alterations had not been executed, it is a matter of conjecture just how much longer the building would have remained standing.

Building E was one of the smallest buildings the author has ever had occasion to examine. It was a one story building 30 feet wide with roof construction of wood rafters and wood ties in the form of ceiling joists. The building was in a southern state where snow is a novelty. A lease on this property had just been executed by a merchandising company who was to follow a competing company as tenant. Even though this new tenant had adopted a policy of having all of its prospective locations examined, as recommended by the author, this was a case where "nothing could happen," so he was slow to accept the statement that the roof was unsafe and must be strengthened. A battle of nerves, over a period of weeks, was waged; the roof had never failed before, and it could not become dangerous just at the time he was to move into it; delays—more objections. The argument was settled abruptly when the roof failed, and a considerable section of it fell to the floor. Impending danger is often difficult to establish in the mind of owner or tenant.

Finally—

In the cases of alterations and repairs, cited herein, no attempt has been made to give text book analyses of stresses and descriptions of methods used in arriving at the conclusions set forth, but rather the intent has been to give an overall picture of the conditions encountered in such work, the potential consequences involved, the temptations, and the realization that it can happen here. In this way a greater coverage can be accomplished by the reader in a given time. Since starting to read this article you may have become more failure-conscious, and if so, you might become more so if you make some studies and observations of failures as such. Now, to what does all of this add up?

1. Alterations are more difficult than original designs but almost anything can be done if the whole truth is found. Hidden or secondary conditions must be given careful consideration. Don't be in a hurry to give the answer. If you still cannot devise a safe and satisfactory solution, you had better say so.

2. A study of the feasibility of a particular alteration job is very important, probably more so than the execution of the design.

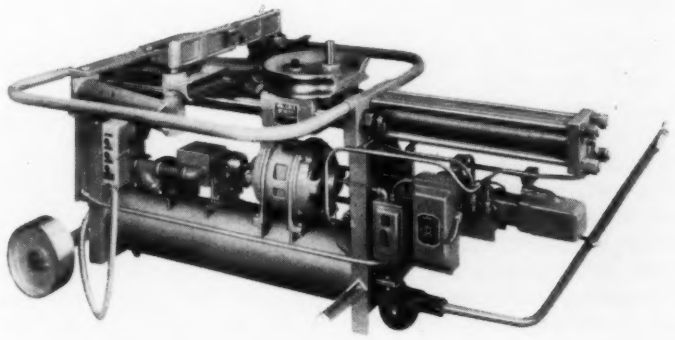
3. Each alteration or repair undertaking is a special job and care must be exercised in comparing it with any other job. If it is comparable, the method of solution must be reviewed independently and impartially.

4. Do not accept design drawings per se as final evidence of what exists to start with and upon which to draw important conclusions. Conditions at the site both before and during progress of work are important in alteration and repair work.

5. In alterations requiring the transfer of loads from present members to new ones, the disposition of the new members should be carefully studied for ease of transfer of load, with a view to minimum shoring. A good shoring contractor may be able to furnish invaluable counsel in this regard. Yes, a contractor can be of genuine help to an engineer on designs in which construction procedure is important, and is reflected in the design.

6. Beware of small buildings; there are more failures in small buildings than large ones. Alterations may require all the skill and patience you can muster, but the satisfaction derived from the solution of a problem which at first seemed impossible is a dividend that will stay with you, and the mastery of this problem will make future ones easier.

NEW PRODUCTS



Bending Machine

The Wallace Supplies Mfg. Co. announces the addition of a new portable, hydraulic, ram type bending machine, identified as the No. 1402, to it's present extensive line of world famed "Wallace Benders".

An entirely different and simplified method of ram bending. No repositioning of the dies nor relocating of the pipe when bending up to 180 degrees in one continuous operation.

Equipped with standard die equipment for bending up to 2" extra heavy weight steel pipe. Special dies available for angle iron, channels, reinforcing bars, flat bars, etc.

Ideal for construction work, radiant heat applications, etc. Push button controlled for maximum production output. "Jog" button provided to facilitate setups or accurate duplications of special parts formed to templates.

OBSTACLES TO

James S. White*

Presented before The Western Society of Engineers, April 20, 1948

In order to promote safety consciousness, install safety measures and devices, and reduce the accident rate, a number of obstacles to safety must be encountered and overcome.

The safety man himself may be an obstacle due to the lack of a clearly defined purpose. He should have some simple philosophy to carry him through arguments and enable him to resist such statements as: Accidents run in cycles. Accidents are due to carelessness. People learn only by experience.

The simplest philosophy that I can determine is:

1. No man wants to get hurt.
2. Every man is entitled to a safe place in which to work.
3. Every man should consider safety as part of his job.
4. Accidents are unnecessary, wasteful and denote inefficiency.
5. Accidents are caused and they don't just happen.

There are thousands of obstacles to industrial safety but I believe they can be divided into two classes.

1. Personal obstacles.
2. Impersonal obstacles.

However, investigations of accidents seldom show just one obstacle or cause. At least 50% of the time corrective action has to be applied on both a personal and impersonal obstacle.

The first class of obstacles can be described by almost any word beginning with "in". The more common ones are inattention, inexperience, indifference, inaction, indecision, etc.

The second class, or impersonal obstacles, includes machinery, tools, equipment, materials, objects, buildings, floors, doors, etc. of a general environmental nature which in one way or another, may be traps awaiting an unwary worker.

Suppose you suddenly found yourself as a safety director amid unfamiliar operations and out in the shop you find the foremen and employees indifferent to your suggestions and recommendations.

Your best bet, in a situation like that, is to get a written outline of a safety program in front of your boss as soon as possible. Make it a simple program of your proposed activities for the next six or twelve months. Make it simple and one in which most of the personnel can participate. One of our obstacles in safety work is making a program which is too inclusive. You can always add to a program as the necessity arises.

Our first program consisted of just three essential items; namely,

1. Accident reporting
2. Safety committees for departments
3. Distribution of as much safety material as we could handle without waste.

We discarded the old three page accident report and substituted a report with only five questions.

1. What was the employee doing at the time of injury?
2. What was the unsafe practice?
3. What was the unsafe condition?
4. What corrective action was taken immediately?
5. What other corrective action should be taken?

Within a year's time the quality and response was such that I had no further complaint.

It has been said that out of 330 injuries, 29 will be medical and 1 lost time. Well, we ran smack into an obstacle which we didn't know what to do with. We didn't know and could not tell from our investigations just where the next lost time case would strike. We found that one man could trim his finger nails on a square shear with only a small finger tip injury—but the next man would cut his finger half off. The severity of the injury depended on luck. However, we were checking only accidents where they were serious enough to require medical attention. We decided to attack it by screening all injuries no matter how trivial. We picked out all those of a lost time type and notified the foreman each time one occurred. By the intelligent use of this information in our safety committees, we actually predicted how and where some of the lost time cases would occur.

Have you ever tried to set up a recording system for the injuries in your plants? A large number of employees do not want to report at all. There are still some foremen who, by improper investigation of injuries, actually discourage people from going to First Aid. There are some employees who do not want to give information to the nurse because they feel guilty and do not want to confess their inattention or poor judgment which preceded the injury. We overcame these obstacles by advertising the necessity of prompt reporting of injuries. We obtained posters from the Industrial Commission and posted them in conspicuous places. We secured safety films on the subject of infection and showed them to groups of employees. We explained to the departmental safety committee men the need for accident data from which we could make summaries.

The second essential point of my first program was establishing safety committees. We set up a central or executive committee and since each department had different operations we also set up departmental committees. Insofar as possible the safety needs of a department were handled by its committee. This furnished a channel both from employee to management and vice versa.

The third item of our first program had to do with educational material. We displayed or distributed posters, booklets, pamphlets, inserts, and instruction cards; not on a wholesale basis, but when and where our accident summaries indicated. We utilized the State and the U. S. Department of Labor. If our accident summaries showed a high percentage of delayed reporting cases in a particular department, we would put on a departmental campaign with films, posters and exhibits. We would investigate a number of the cases and ask

*Safety Director of the Fansteel Metallurgical Corp., North Chicago

INDUSTRIAL SAFETY

for cooperation from the individual employee.

We found many ways to advertise safety. We use our interoffice envelopes to carry a safety message. We use carboy indentification signs to carry a safety message. We also maintain a safety record board showing how each department stands and also post large numbers on the board to indicate the number of days which the entire plant has operated without a lost time accident. In addition, we have used other materials such as home-made payroll inserts.

We have had many conditions or situations due to congested work areas, due to poor lay-out of equipment or buildings or due to improper tools, where it seems there is nothing else for the employee to do except get hurt.

I believe we overcame inaction by enlisting the activity of others, by rotating membership on our committees, by assigning members a safety task. I believe we cut down the indifference and passive resistance by sincerity of purpose. I believe there was less indecision after we learned to decide on some safety matters; even though, at times they appeared to be insignificant. I believe that we demonstrated that decision and action wasn't so painful after all!

We had some employees who firmly stated they could not wear safety goggles. We had all kinds of arguments. In some instances the goggles were no good. Often they were wrong in size. They frequently needed adjustment. We ordered special bridge sizes for some and special lens sizes for others. In several instances where we were in doubt we sent the goggles and the employee to an optometrist for proper fitting.

During our safety work in the chemical department, it became obvious that we should have a compulsory safety goggle rule. Their previous accident record was bad.

A group meeting was held of all chemical workers and the facts were presented. The majority agreed that eye protection should be worn and that they would wear it if the right kind could be found. I secured all the samples I could get from various manufacturers. Another meeting was held. The different types of eye protection were displayed. We voted on the type and they are still the standard chemical department eye protection today and are being worn.

We tried many different approaches in more than one department to get compulsory eye protection. The results were unsatisfactory. We were accused of trying to goggle-ize the whole plant. So, we took a different attitude. We adopted and worked on the idea that goggles were an emergency device. We made a sincere effort to guard the operation. In many instances we found it no longer necessary for the man to wear goggles! By all means furnish and have accessible all these devices for emergencies. Make compulsory only after a sincere effort has been made to guard the operation.

There are types of manufactured guards which serve to "goggle" the machine instead of the worker. Proper exhaust systems prevent many eye injuries. Home-made guards like screens, barriers, dust stops, etc. prevent eye injuries. We often meet with the obstacle of getting the right guard, i.e. the one the operator will use and won't remove. We found that operators of machines had a dormant ingenuity. The operators often knew the limitations as well as niceties of design of a guard. We know that most of our guards stay on the machines because the operators were consulted.

We had an epidemic of accidents on our elevators. People would get their fingers caught between the heavy doors. The flange or fire seal makes a good guillotine. We tried a number of ideas and finally got a suggestion for a double swinging door strap which could be left in or out of the shaft.

The fans we bought had guards with large open spaces. They were very dangerous because accidents occurred when several people caught their hands in them. We installed additional guards of ½" mesh screen.

We have a number of presses which are commonly called "pill presses". They operate at high pressures and we had punches explode. The pieces, like shrapnel, would fly in all directions. We successfully guarded this by means of a piece of hose fastened around the punch and which would contact the press table at the same time the punch entered the die.

We have had more than our share of "Luck". Some people believe that a belief in "Luck" evidences a superstitious person. It may be so. However, for want of a better word I say we have had a phenomenal amount of "Luck"! In my safety work I have had a lot of luck. With 1/10 of it on the stock market I would be a millionaire in no time at all.

Beneath all safety work there must be an undercurrent of interest which puts fire in it and makes people bring unsafe practices and unsafe conditions to the surface. In order to get the pot seething many avenues are open for enlisting the activity of others. How does your sales department function and how does your advertising department advertise? The mere asking for advice of these sources may bring safety to their attention. I owe a great deal to our advertising department. They are always willing to help in the design of posters, signs, plaques, etc. The work they do for me often comes to the attention of others. My mentioning the fact "the advertising department is working on it" often put the work in a better light and lends importance to it. We have a company movie which we loan to our customers and altho I have seen it several times I have not yet noticed a scene in which safety was violated. The advertising department took particular

(Continued on Page 30)

Safety

(*Continued from Page* 29)

pains to see that such a mistake was not made. Most people are glad to give out advice and again the mere stating of the problem awakens interest and curiosity. Our chemists, metallurgists and engineers are no different and are willing to give advice at the "drop of a hat." I have a working agreement with some other safety men and we swap advice whenever we can. We utilize any outside agencies that we can. The safety equipment companies do a lot for us, the manufacturers of the equipment and the materials that we buy favor us with answers to some of our safety problems.

Safety work is somewhat like a speech.

We try to practice specific job instruction with the inclusion of safety as part of the job and not as something extra.

We have held the well-known Foremanship Safety Training courses and have tried to follow this up with additional safety educational movies or foremen's safety conferences run by the foremen themselves. We want safety as part and parcel of a job, every job, and not as something extra to be occasionally taken out, dusted, shown and then put away until the next major accident wakes us up again. The reason why we all need more specific instructions is because our language lends itself to misunderstandings. Your definitions of words are not the same as mine and your ear and sight impressions are not the same as mine.

Tell your people yourself about the hazards before they get misinformation from outside sources. For example, I recall an article that was published in one of the Chicago newspapers relative to the health hazards in connection with a raw material which we were using. Although I do not want to argue with the newspaper, I do believe that they had edited and re-edited and further condensed the article to a point where it was positively dangerous. A number of our people read this article and misinterpreted it. Consequently, we had no end of trouble.

Most obstacles can be removed or corrected when they are clearly understood. If it is inaction, lick it by action. If it is incredulity, disperse it with proof. If it is poor housekeepng, clean it up yourself if necessary. If it is a dangerous machine operation, shut it down, pull the switch and lock it.

In conclusion I say we are proud of our safety record. We don't say accident record any more because our record is more on the safe side than the accident side. We have come a long way. We still have a long way to go. We have new problems every day. Five years ago we had a very simple program. Today we have a more complete program, but no more help to run it than before. We feel that others can make the progress that we have made and perhaps quicker, because their operations may lend themselves better to safety work than ours do.

I pay tribute principally to our foremen who have come to realize that they are the safety directors in their departmnts. I pay tribute to the management of the company which has had patience and did not expect a miracle overnight.

And I believe that the majority of our personnel, by far, believe that Safety is Everybody's Business.

American Society for Quality Control Meets November 5

The eight midwest sections of the American Society for Quality Control are holding their Third Midwest Quality Control Conference at the Sherman Hotel in Chicago on November 4 and 5, 1948. The Conference is again being sponsored by the Chicago Association of Commerce.

Highlighting the Conference program will be the luncheon sessions, at which two top-ranking business executives will give down-to-earth talks on the benefits of statistical quality control applications in their plants.

On the first day, Col. Charles D. Wiman, President of Deere & Co., will feature Mr. Hugo A. Weissbrodt, Works Manager of International Harvester's Fort Wayne Motor Truck Division.

The Conference will feature many exhibits, where the latest devices for measurement and control will be demonstrated.

The cost of the two-day meeting, including luncheons and sessions is $15.00. Further details may be obtained by writing to Third Midwest Quality Control Conference, P. O. Box No. 1097, Chicago, Illinois.

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Industrial Relations Today

Donald V. Steger*

During this past decade employers, particularly larger corporations, have developed new techniques in dealing with their employees and the unions.

I would say that Industrial Relations is:

"The design, planning and execution of a program, embodying a series of activities and techniques which, when correlated and practiced, correct, when necessary, conditions of work in order to achieve continued high productivity and industrial peace."

The illustrations are academic and indicate the scope of management's contact with the function. Departmental structure and activity assumed within each function are illustrated. These may be executed in whole or in part depending upon the size and type of the business.

Executive Qualifications

Understanding people is an absolute necessity as a qualification for association in the employer-employee relation field. No persons should aspire to a position in Industrial Relations if they shall be limited in this basic philosophy:

1. That industry has the right to expect a high level of worker productivity and quality workmanship in order to maintain a competitive position.
2. That the executive responsible for employee good-will and loyalty—(without which the production schedules will not be met)—must be a HUMANIST—fully capable of sympathy with and understanding of the employees, as well as management's problems.
3. That the executive charged with industrial relations responsibility must have character, stature and patience that will enable him to view broadly the problems on both sides and work on behalf of the employee in the same good conscience and energy he would utilize in protecting the company's interests.

Operating Cost

Let us assume a company with 3000 employees. The budget for an Industrial Relations Department with 28 to 30 employees would approximate $90,000 to $100,000 annually. Remember, the service is rendered to all employees alike and to all company departments, so the Industrial Relations Department is properly charged only for those items necessary for its own maintenance. If a cafeteria service is planned, its separate budget would approximate $100,000 annually.

Organization

Behind the top Industrial Relations executive are several "key men" charged with the responsibilities of the several departments or units.

Outlined below are the functions under administration and planning:

ADMINISTRATION AND PLANNING

ADMINISTRATION	PERSONNEL PLANNING
Department Organization	Practices and Procedures
Department Management	Planning
Formulating Policies	Occupational Analysis
Policy Administration	Job analysis
Current Practices	Job planning
	Utilization Analysis
	Manpower analysis
	Work method analysis
	Personnel Inventory
	Manning table
	Skill inventory
	Staffing inventory
	Insurance and Hospitalization
	Medical examinations
	Termination of employment
	Holidays and Vacations
	Leaves and Absences
	Retirement
	Women and Minors
	Transfer and Promotion
	Wages and Hours
	Other items excluded from a collective bargaining contract.

Any changes in policy and procedure should be immediately noted and a new page to cover inserted in the manual.

I think one of the gravest mistakes a company makes is to guess at its policies concerning employees.

Plant Staffing

Under the column "Personnel Planning", there must be established an aggressive program for staffing a plant. This contemplates studies and assignments to familiar duties for the employee. A determination should be made of potential latent abilities leading toward added responsibilities and leadership.

The first step in planning is to gather all current practices and policies affecting employees and reduce them into written manual form. Some of the subjects will involve the application and interpretation of company policies respecting:

Manning Table

The best tool to provide the company with a full staff is a manning table which reflects an inventory of the employees in all the departments, their skills and transferability from job to job as may be required.

(Continued on Page 32)

*Executive Secretary, Western Society of Engineers

(Continued from Page 31)

PERSONNEL MANAGEMENT

EMPLOYMENT
Recruitment of Applicants.
Liaison with State Employment Service.
Selection of Applicants.
Assignment of Applicants.
Indoctrination.

PERSONNEL RECORDS
Central Record File
Record Simplification
Statistical Controls

PERSONNEL CONTROL
Employee Promotion
- Merit rating
- Upgrading

Employee Transfer
Worker Requisitions
Worker Separations
Office Employees
Related problems

EMPLOYEE ORIENTATION
Application Interview
Induction Interview
Work Interview System
Work Counseling
Aptitude Testing
Re-interviewing
Preemployment Classes
Preproduction Classes

TRAINING
On-The-Job Training
Instructing Trainors
Training Areas
Supervisory Training
Work Simplification Course
Related Work Training
Training Follow-up

LABOR TURNOVER
Manning Statistics
Basic Causes
Preventive Methods

PERSONNEL MANAGEMENT

The activities under personnel management are indicated in the following columns:

Records

The old "family" concept of knowing each worker has faded since the growth and decentralization of modern industry, reckoning employees by the thousands. If records were kept in each department, rather than in a central office, it would be a physical impossibility to keep tabs on so many people. Consequently, the logical place for employee records is in the Industrial Relations Department.

Turnover

Everytime an employee quits his job, a company loses an investment. The time and money spent in training and building for potential productivity is a dead loss. So, labor turnover must be kept at a minimum.

In addition to offering a variety of services, proper working conditions, pleasing surroundings and other morale building devices for management. The techniques are illustrated under each functional responsibility.

SALARY AND WAGE ADMINISTRATION

Salary and Wage Administration is the pulse of successful personnel the employee, the orientation period is of greatest importance.

Job Evaluation

There must be a logical planned system of salary compensation with jobs paid for according to value. Only one rate should apply to a job title. Rate ranges should become effective in each classification to afford the supervisor sufficient latitude to compensate employees for improvement. Seniority, alone, is not the criteria for increases in wages. Standards must be set and periodic reviews made of all employees to enable them to advance in salary or classification. Such reviews to be based upon fixed formulae of factor comparisons, evaluating the job itself and merit rating.

Merit Rating

Some of the factors included in merit rating are:

a.) Personal qualities, performance, intelligence
b.) Capacity and ambition for advancement
c.) Strong and weak points
d.) Self improvement of weak points
e.) Extra-curricular work and study
f.) Immediate promotability
g.) Potential promotability

JOB CLASSIFICATION
Job Title
Job Description
Job Evaluation

TIME KEEPING
Control of Timekeeping System.
Time Clock Policies.
Administration of Timekeeping System.
Maintenance of Timekeeping Records.

RATE SETTING
Establishment of Rates.
Time and Motion Studies.
Formulation of Salary and Wage Policies and Systems.
Adjustment of Rates.
National and Area Comparisons.

PAY ROLL
Determination of Applicability of FLSA.
Coordination with Paymaster in Pay Roll Changes.
Determination of Employee Deductions and Contributions.

LABOR LAWS

A working knowledge of labor laws—both Federal and State is a "must" for the aspirant to a job in the Industrial Relations field.

The National Labor Relations Act and other labor legislation gave labor the tools with which to build. The rules were all in favor of labor and the NLRB and the courts decided cases against the employer. Because of the militancy of so many unions, Congress passed the Taft-Hartley Act.

Let us take a quick glance at a few of the benefits to employers:

1. The right of an employer to deliver an anti-union talk to his employees.
2. Outlaws strikes in support of secondary boycotts and jurisdictional strikes.
3. Provision for suing unions for wildcat strikes.
4. The 60 day cooling-off period.
5. Requirement that unions bargain in good faith.
6. Denial of right of foremen to have representation by unions representing employees they supervise.
7. The right to petition for decertification of a union.

Perhaps these and other legislative changes will produce a bilateral state of contractual bargaining and tend to balance the pendulum.

A glance at the table of activities under the function of "labor relations" suggests the broad responsibilities encountered by management in this department.

Labor Policy

The first line of defense a company has against the demands of the union leader is the supervisory force. They are the ones who must enforce plant rules and live with any policies evolved. Policies should be designed to consider their interrelation with production requirements.

Plant Rules

Rules and regulations briefly describe the policies of the company in connection with given situations, such as proper use of time clocks, leaves of absence, tardiness, theft, absenteeism, good house-keeping, shop discipline, personal behavior, etc. Be sure that the rules are **workable, realistic,** and **practical.** If they are a part of the collective bargaining agreement so much the better, since the union gives the rules official recognition and is more apt to aid in their enforcement.

COLLECTIVE BARGAINING

Collective Bargaining is the technique whereby formal discussions between management and labor may result in mutual understandings leading to a contract, wherein is set forth the terms governing wages, hours of work and conditions of employment, between the parties.

Union Responsibility

Labor unions have reached the stature of big business. Their treasuries bulge. Their leaders and lawyers are compensated on a par or above some corporation executives. A few of the salaries paid union representatives as referred to in a recent Life Magazine report, are: $18,000, $22,000, $22,500, $30,000, and $32,000 per year.

A corporation executive at that salary level would be expected to have active civic responsibilities and there should be some serious thinking on the part of the union leadership about the welfare of the community at large and the folks who live in it, even though those folks don't belong to their union.

The expansion of the trade union movement and its gains in membership and financially has been phenomenal in this past decade, but with that growth should also come stability and maturity.

Skill in Negotiating

The skilled negotiator anticipates the demands of employees in advance. He comes prepared to discuss the application and changes of the Cost of Living Index; he has studied and compared contract clauses in a hundred other management-labor contracts, so he will know if the demands are in line with national and local practices;

(Continued on Page 34)

LABOR RELATIONS

LABOR POLICY
Inter-relation with Production.
Plant Rules and Regulations.
Enforcement of Rules and Regulations.
Supervisory Participation.

EMPLOYEE RELATIONS
Development of Standard Plant Discipline.
Administration of Discipline.
Control by Supervision.

UNION RELATIONS
Policies.
Administration of Program.
Attendance.
Productivity.
Length of Service.

EMPLOYEE MORALE
Labor-Management Committee.
Suggestion System.
House Organ.
Employee Handbook.
Plant Clubs.
Recreation Programs.

EMPLOYEE DISCIPLINE
Determination of Proper Bargaining Unit.
Development of Company-Union Contract.
Area and National Practices.
Collective Bargaining Techniques.
Administration of Contracts.
Grievance Procedures.
Arbitration.

EMPLOYEE SERVICES
Commissary Facilities
Transportation Facilities
Housing Facilities
Consulting Services
- Legal advice
- Tax assistance
- Social service

Employee Benefits
- Mutual Benefit Ass'n.
- Credit union
- Group insurance
- Hospitalization
- Pension plans

Shopping Assistance
Banking Assistance
Personal Problem Help

(*Continued from Page* 33)

he has analyzed the demands of the union and knows what points he may quickly yield on and what shall be bargained for; he has prepared a list of company demands, since the procedure is of a bargaining nature; he has studied the latest legal case histories and their application to the contract; and he comes with the knowledge of when to speak, when to compromise, when to remain silent, and when to recess a conference when the going gets rough and the issues are clouded.

The skilled negotiator has kept tabs on the workings of his own collective bargaining contract and is prepared to suggest changes if need be; he has armed himself with statistics of productivity; he has prepared his assistants and other company representatives to jump into a breach or strengthen an argument; he knows that union tactics are frequently militant and irresponsible, but he won't be bluffed; he does not employ the use of epithets—they waste time and energy and lead into traps; and he knows that if he can conclude a contract, without going to arbitration, he has succeeded in insuring the company for another year of higher, peaceful productivity.

Grievance Procedure

The written grievance procedure is probably the surest way to prevent slow-ups and cumulative dissatisfaction. The purpose of this device is to give the aggrieved employee an opportunity to express his grievance. It gives the company a written record of performance on the part of those charged with the responsibility of handling worker problems, it is also a check on frequency of complaints within departments and more important —a record for use in arbitration or legal proceedings.

Timing is important in settling a complaint. If the various steps do not result in settlement, arbitration usually follows. Up to the point of arbitration, a grievance should be disposed of within seven days.

Labor-Management Committees

Composed of an equal number of representatives of management and labor, the Labor-Management committee is an important aid in assisting management in the solution of production problems, employee morale, etc.

Taking a broader view of shop practices, the Committee's discussions and recommendations include appraisals of production methods and schedules; stimulation of the Suggestion System; ways and means to reduce absenteeism; types of recreation programs; and general improvement of employee morale and welfare.

Other than the Medical phases of Employee and Plant Protection, the Engineering Department is usually charged with the responsibilities of this activity. A study of the listed functions, however, indicate a close correlation with Industrial Relations.

EMPLOYEE AND PLANT PROTECTION

MEDICAL

Pre-employment
Physical Examinations.
Medical Treatment.
Preventive Occupational Medicines.
Nurse's Home Visits.
Compensable Injuries.

SAFETY ENGINEERING

Safety Rules
Safety Clothing
Lighting
Safety Committee
Accident Prevention
Good Housekeeping
Safety Inspection
Insurance

PLANT SECURITY

Guards and Watchmen
Employee Investigation
Employee Indentification

FIRE PROTECTION

Fire Patrol
Fire Prevention
Fire Inspection
Fire Brigades
Extinguishing devices
Fire Drills

SUPERVISORY RELATIONS

Coordination Program.
Foreman Associations.
Training Programs.
Foremen Relations.
Foremen in Management Positions.
Foremen in Industrial Positions.

Salary and Wage Administration has been designated as the pulse of successful Personnel Administration. Supervisory relations can be catalogued as the HEART of productivity.

If a foreman or supervisor is expected to maintain his authority on that "front line of defense" for management, he must be fully trained **by management** and enjoy the confidence of the Superintendent. The supervisor must be given the knowledge and share in making of company policies affecting production. He must be told from time to time what his future is with the company and have frequent opportunity for self-expression without prejudice. A foreman is human and may have grievances too.

Regular training courses and all the helpful literature printed should be at the disposal of the supervisor. The dignity of his position should be amplified with memberships in foremen's organizations and conference groups, **paid for by the company.** He should sit at the right hand of management whenever and wherever possible.

Compensation for supervisors must be equitable, fairly evaluated — performance recognized and abilities rewarded.

(*Continued on Page* 35)

PUBLIC RELATIONS

Press Contacts.
Plant Tours.
Community Programs.
Local and National
Industrial Relations
Programs.
Company Media.

Too often management overlooks the fact that employees are as much a part of the community in which they work as the neighbor who may be employed elsewhere.

A company with a narrowed internal operating philosophy may find itself the target of malicious community gossip, which may spread and reflect upon the company's products and services, thus impeding sales. A LOYAL, HAPPY WORKER CAN BE ONE OF THE BEST SALESMEN THE COMPANY HAS.

Communicating to and inviting workers to participate in company problems and activities through the house-organ and other media is the surest way to a sound employee public relations program.

Company participation in community affairs and good press contacts are extremely helpful devices in fostering good-will.

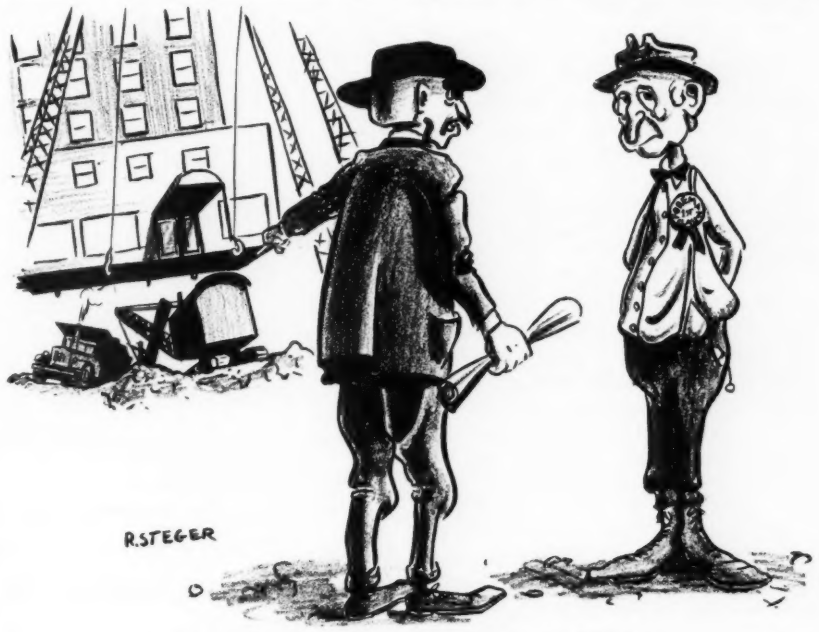
Conclusion

It is not too important that these techniques be designated as "Industrial Relations" or another name. It **is** important that we recognize the correlation of the various activities. It would be impractical to suggest, moreover, that the application and execution of all of the functions honestly and meticulously would achieve a Utopian State in the employer-employee relation. After all, we are dealing in HUMAN NATURES.

The techniques illustrated are sets of flexible guides, the use of which may assist management and workers alike, to solve mutual problems and to maintain quantitative productivity in an atmosphere of industrial peace.

Editor's Note: It may be of interest to the engineering profession that many key positions in the Industrial Relations Department are filled by engineers.

PREFABRICATION?



If you'd read the simple directions, Crinchelcrust, you'd know that the cellar is not dug last.

New Wood Adhesive

A new, quick setting, room temperature urea resin adhesive for the woodworking industry that sets in 10 minutes has been developed in the research laboratory of the Timber Engineering Co.

Known as Colpres 10, the glue research was undertaken by the hardwood industry's Committee on Research Administration, an activity of the National Lumber Mfrs. Ass'n., to provide a type of glue that has long been needed.

Furniture plants and others will need no new, expensive equipment in using this adhesive. It sets at room temperature (75° F.) and the setting time is so responsive to temperature changes that the speed of cure can be easily adjusted to production line requirements. The glue is water resistant, non-staining and of great strength.

Colpres 10 is a two part adhesive consisting of a dry powder formaldehyde resin which is mixed with water and applied to one of the wood surfaces to be glued, and a liquid hardener which is applied to the other surface.

Parts glued at room temperature are ready for machining in 10 minutes.

Telephone Hyde Park 4910
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Specialized Technical and Engineering Department
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SALT LAKE CITY, GREENVILLE, PA.

John Crerar Library News

In the intervening fifty-three years since its establishment, The John Crerar Library has grown to be the largest free public library in the world devoted exclusively to the sciences and their application in agriculture, engineering, medicine and industry.

The collections of the Library total more than 700,000 volumes and are especially strong in chemistry, physics and geology, and their applications in engineering; and in general biology, botany, zoology, and their applications in medicine and agriculture.

The service that Crerar renders to its users is closer to that of a special library than it is to that of the typical public library. Some facilities for serious research workers—such as desks, typewriters and dictating machines—are available; and the Library is planning an enlarged program in this area. Questions are answered for persons telephoning, sending inquiries by mail, or appearing in person. Thousands of photostats and microfilm copies of material in the Library's collections are furnished each year at cost.

One of the Library's most noteworthy developments, is the Research Information Service. This service involves the addition to the staff of research librarians and consultants who are available for special bibliographical assistance, including more intensive literature searches than are normally undertaken in public libraries. The announced objectives of the service, which was started a year ago, are: "To make the vast store of accumulated knowledge at the Library more readily available to technological, engineering, and scientific interests, the professions, industry and business, and the public generally, and to facilitate the distribution and use of the unprecedented volume of information on current developments in these fields."

Since Crerar is a free public library, its services are available to satisfy any reasonable request for help. The Research Information Service, however, is a costly undertaking for the Library. For the three-year trial period set by Crerar's board of directors the cost was estimated at $100,000. More than 25 Chicago business concerns have contributed to the expenses of the service.

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Personals

Edward J. Wolff (M'48) is now a member of the firm of **Bueter & Wolff, Inc.,** engineering consultants, at 37 S. Wabash Ave.

The J. W. Murphy Company is now **Meters and Controls, Inc.,** at 236 N. Clark St. Our members are: Carlot B. Hovland (A'36;-M'47) and Thomas G. Robinson (M'47).

The new address of **Bates & Rogers Construction Corp.** is 600 W. Jackson Blvd. Lester C. Rogers (M'36) is a WSE member.

W. T. McCullough, Jr. (M'39) is now Manager, Stationary Boiler Sales of The Babcock & Wilcox Co., New York. He was formerly District Manager, Chicago office.

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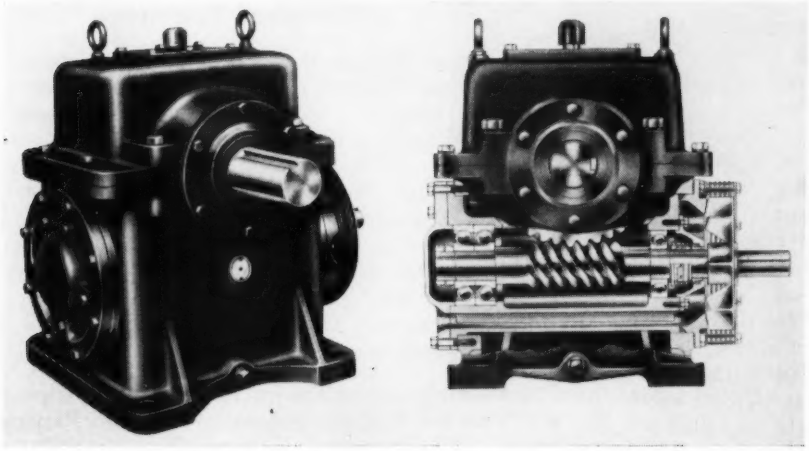
PYRASTEEL For Heat and Corrosion Resistant Alloy Castings
EVANSTEEL For Shock and Abrasion Resistant Alloy Castings
Our Engineers Are Available for Consultation

New Products . . .



Shown above are two views of a new Hypower Enclosed Worm Gear Drive Horizontal Unit which is being introduced by Foote Bros. Gear and Machinery Company.

Steel Adjustable Shoring Device

A new type steel adjustable shoring device, capable of supporting, with perfect safety, considerably more than the collapsible weight of the hand-made timber shore, has been introduced to the building industry in the United States and Canada.

Its manufacturers, Acrow Ltd., of London, England, report that one-half million of these shores are in use by the building trade in Britain today, and that 95% of all the steel shoring done on construction projects in that country, employ the use of this adjustable Steel Shore.

In addition to its use in supporting temporary formwork to concrete floor arches, beams, walls, columns etc., it is adaptable to scaffolding and sway bracing. The shore is made in four heights ranging from 5′ 7″ to eleven feet and is adjustable up to 15 feet when fully extended.

Operation of the shore is effected by one person. Since no jacks and bars are required, a workman can stand upright and in three simple movements can accurately erect it to any working range in a matter of a few seconds. This consists of lifting an inner tube, inserting a pin in the nearest hole which acts as a safety lock, and turning the handle for final adjustment.

Since there are no loose parts to mislay, the shore is compact, easy to store and transport. It can be removed and used again and again on projects with a minimum of maintenance care. "They are practically indestructable", according to the manufacturers.

Enclosed Gear Drive

Foote Bros. announces the introduction of a new line of enclosed worm gear drives in both horizontal and vertical types.

Foote Bros. Hypower units, the manufacturer states, are smaller in size than conventional drives of equal capacity. They deliver power at lower cost and because of their high thermal capacity, they permit the use of a smaller, less expensive reducer which means a savings in original cost.

Among the features which contribute to the superior performance of these drives are:

Increased low carrying capacity.
Increased thermal capacity.
Prevention of leakage of oil.
Reduction in size and weight.
Better metallurgical control of material and improved manufacturing techniques.

Foote Bros. Hypower worm gear drives are available in horizontal and vertical types in single and double worm gear reductions, in a wide range of standard ratios to meet practically any need. These units comply with the speed-ratio standards adopted by the American Gear Manufacturers Association (AGMA), and the National Electric Manufacturers Association (NEMA).

PAGE ENGINEERING COMPANY
MANUFACTURERS OF
AUTOMATIC DRAGLINE BUCKETS
PAGE DIESEL WALKING DRAGLINES
CHICAGO

Book Reviews

Meteorology

By William L. Donn, published by McGraw-Hill Company, Inc., 1946, 465 p.p.—$4.50.

This is an elementary treatise of modern weather theory, analysis and interpretation. The author has separated atmospheric phenomena into seven variable factors, namely (1) heat and temperature, (2) humidity of the air, (3) condensation, (4) clouds and state of sky, (5) kind and amount of precipitation, (6) atmospheric pressure, and (7) winds.

After a fairly comprehensive discussion of each, he presents a qualitative integration of these variables leading to weather forecasting from reports, measurements and visual observation of atmospheric conditions, and acquaints the reader with practical weather summaries. The book is clearly written and richly illustrated with drawings, charts and photographs.

K. E. W., Member, W.S.E.

Fundamentals of Automotive Mechanics

By James V. Frost, published by John Wiley & Sons, Inc., New York, and Chapman & Hall, Limited, London, 1946, 545 p.p.—$2.80.

This excellent and comprehensive manual describes and illustrates all mechanical and electrical main and auxiliary equipment of the modern automobile, explaining its operation, maintenance, greasing, failures and repairs, together with safety and legal requirements. It is intended for use as a text book for high school students or others who expect to own, operate or repair automobiles. The material presented should be acquired both by the owner and the automobile mechanic in order to improve cooperation essential in maintaining and safe-guarding such expensve and potentially dangerous machinery.

E. B., Member, W.S.E.

Mechanical Testing of Metallic Materials

By R. A. Beaumont, published by Sir Isaac Pitman & Sons, Ltd., London, 1945, 142 p.p., $1.75.

This book is based upon lectures and demonstrations given by the author at the Mechanical Testing Laboratory of the College of Aeronautical Engineering at Chelsea, England. It deals with British Standard Specification tests in a practical manner and in this second edition the subject of proof stress remains one of the principal features. It illustrates and describes many testing machines. Chapters are devoted to the tensile test, proof stress determination, types of tensile-testing machines and instruments, hardness and impact tests, the calibration of machines, tests on sheet, strip, wire and tube, radiological testing and crack detection.

The fundamentals of testing metallic materials are carefully presented and this information should be generally applicable and together with the machine descriptions similar to American practices.

E. B., Member, W.S.E.

A. I. E. E.

American Institute of Electrical Engineers

The Chicago Section of the American Institute of Electrical Engineers will hold 22 meetings during the season 1948-49. Nineteen meetings covering subjects in Power, Industry, Electronics, Communications and Basic Sciences will be held at the new 84 E. Randolph Street location of the Western Society of Engineers. The meetings are held on Thursday evening, with pre-meeting movies at 6:30 PM and the main subject at 7:00 PM. Three general dinner meetings will be held in the Steven Building Restaurant at which prominent engineers will be the guest speakers.

The meetings scheduled for the month of October are: October 7, 1948: Subject: "Practical Experiences with Resonant Neutral Grounding in a Large 34.5 Kv System." Presented by Mr. Harold H. Brown, Chief Electrical Engineer, Wisconsin Michigan Power Company, Appleton, Wisconsin. Mr. Brown has been engaged in the electric utility industry for nearly 30 years and is well known as the author of several technical papers. This lecture will deal with the practical side of ground fault neutralizer applications in a manner that should be of great interest to all members. The lecture will be illustrated with slides.

October 14, 1948: Subject: Modern Theories of Conduction of Electricity" or "Why Electrons Stray from Home". Speaker: Dr. Karl K. Darrow, Research Physicist of the Bell Telephone Laboratory, New York, N.Y. Dr. Darrow is well known in the field of Basic Sciences and has spent many years in the development and investigation of modern theories.

October 28, 1948: Subject: "Nucleonics" by Dr. Lyle B. Borst, Chairman, Nuclear Reactor Project, Brookhaven National Laboratory, Associated Universities Incorporated, Upton, Long Island. Dr. Borst will present many facts of interest in the Electronics field.

Visitors are welcome at all meetings. We are particularly proud to present Mr. E. S. Lee, President of the A.I.E.E., as the speaker for the general dinner meeting to be held December 2, 1948. All members of the Western Society of Engineers are cordially invited to attend this dinner. Mr. Lee will speak on the subject: "Our Institute". Further details on this dinner will be announced later.

Later dates assigned for meetings of the American Institute of Electrical Engineers are:

1948

November 4, November 18, December 9, December 16

1949

January 6, January 13, January 20, February 10, February 17, February 24, March 3, March 10, March 24, March 31, April 14, April 28

Necrology

Carl P. Schroeder (M '04, Life Member) died of a heart ailment August 19. He had been ill for some time, although he continued in his own business as a Consulting Structural Engineer.

Jens P. Nielsen (M '46) died July 23, 1948, of a heart ailment. He worked up to the day before his death in his capacity as President of Argus Manufacturing Company. He was registered in the Mechanical and Consulting Engineering sections.

James E. Maloney (M '93, Life Member) died March 22 in Littleton, Colorado. He was in charge of the Engineering Division, Highway Department, of the State of Colorado from 1921 until his retirement in 1938.

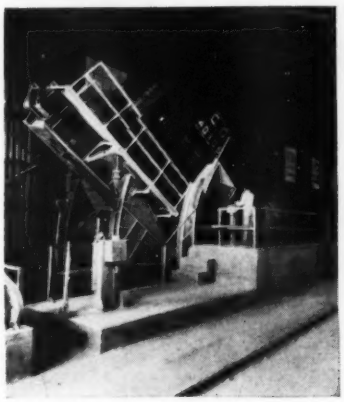
Raphael M. Hosea (M '04, Life Member) died April 12, 1948 at the age of 90 years. During the entire period of his membership, Mr. Hosea was a non-resident member of the Society, serving as Chief Engineer of the Colorado Fuel & Iron Company at the time of his retirement in 1925.

Arthur Montzheimer (M '03, Life Member) died May 20, 1948. At the time of his retirement in 1938 he was Chief Engineer, Elgin, Joliet & Eastern Railway Company.

Raymond W. Dull (M '07-'26; '41) died July 19, 1948 in Hinsdale sanitarium. A consulting mechanical engineer in Chicago for 50 years, he was the author of several books on mathematics and contributed to science magazines.

Clarence R. Knowles (M '19-'38; '47) died August 6, 1948. He retired as superintendent of water service for the Illinois Central system in 1943, when he became Associate Editor of "Railway Engineering & Maintenance" for the Simmons Boardman Publishing Corp.

Grain Unloader



The Link-Belt Grain Car Unloader unloads box car in 4½ minutes.

The Link-Belt Grain Car Unloader, for rapid mechanical unloading of grain or soybeans from box cars, is the subject of a new illustrated booklet published by the Link-Belt Company, Chicago.

The Unloader consists (1) of a structural steel cradle, so mounted on rollers at four points as to permit endwise tipping to 40 degrees from the horizontal in either direction; and (2) a car supporting platform pivotally mounted to permit sidewise tipping to an angle of 15 degrees toward unloading side.

The loaded grain car is spotted on the platform of the unloader, with the outer door of the car open on the dumping side. The disappearing end clamps of the unloader are simultaneously brought into position in contact with the car couplers, and positively center the car on the main cradle. This operation automatically removes the two end locks on the side toward which the car tips laterally.

A door-engaging frame is then brought into contact with the grain door, and the car tipped sidewise 15 degrees. The main cradle is next tipped to a maximum angle of 40 degrees to the horizontal, in one direction, to discharge the grain from one end of the car, and then to 40 degrees in the opposite direction, to discharge a large portion of the grain from the opposite end. A baffle plate is then inserted through the door opening, and the cradle tipped to an angle of 40 degrees to the horizontal in the direction of the first endwise tip, discharging the remainder of the grain from the car.

After the car has been emptied of its load, the car supporting platform with its empty car is again brought to normal horizontal platform. The door opener is withdrawn, and the end clamps are run into their pits, which operation automatically locks the ends of the car-supporting platform. The empty car is then ready to be moved off the platform.

The time required for the complete cycle of operation of the Link-Belt Unloader is 4½ minutes, exclusive of time for spotting of car, and sweeping where necessary. Under favorable operating conditions, an unloading capacity of ten cars per hour can easily be attained.

Personals

Rufus W. Putnam, Past President of the Western Society of Engineers (1927-28) is now directing the Associated Engineers, 1206 Maple Avenue, Los Angeles, California. The Associated Engineers is a group of five firms representing scientific laboratories, and mechanical, chemical, civil and industrial engineers.

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Western Society News

Monday nights at the headquarters will be Western Society Night and members are urged to make it a must in their weekly schedules. The Program Committee announced at their meeting August 4 that no outside organizations would use the facilities.

The following dates were assigned for all Western Society meetings:

	1948
October 4	Bridge and Structural Engineering Section
October 11	Fire Protection and Safety Engineering Section
October 18	Electrical Engineering Section
October 25	Annual Fall Dinner
November 1	Communications Engineering Section
November 8	General meeting sponsored by Hydraulic, Sanitary & Municipal Engineering, and Traffic Engineering and City Planning Sections
November 15	Mechanical Engineering Section
November 22	Chemical and Metallurgical Engineering Section
November 29	Gas, Fuels and Combustion Engineering
December 6	Hydraulic, Sanitary and Municipal Engineering Section
December 13	General meeting sponsored by: Mechanical Engineering and Fire Protection and Safety Engineering Sections
	1949
January 10	General meeting sponsored by Electrical Engineering and Communications Engineering Sections
January 17	Traffic Engineering and City Planning Section
January 24	Transportation Engineering Section
January 31	Bridge and Structural Engineering Section
February 7	Fire Protection and Safety Engineering Section
February 14	Electrical Engineering Section
February 21	Washington Award Dinner (tentative)
February 28	Communications Engineering Section
March 7	Gas, Fuels and Combustion Engineering Section
March 14	General meeting sponsored by Bridge and Structural Engineering and Transportation Engineering Section
March 21	Chemical and Metallurgical Engineering Section
March 28	Mechanical Engineering Section
April 4	Hydraulic, Sanitary and Municipal Engineering
April 11	General meeting sponsored by Chemical and Metallurgical Engineering and Gas, Fuels and Combustion Engineering Sections
April 18	Traffic Engineering and City Planning Section
April 25	Transportation Engineering Section
May 2	Fire Protection and Safety Engineering Section
June 6	Annual meeting

It is to be noted that there are to be five general meetings, the fall dinner and the annual meeting in June with the Washington Award dinner to fall on February 21. The latter date is tentative depending on the wishes of the Washington Award Commission.

Programs will be more of a general interest so that they will appeal to all the members of the Society.

SPEAKERS' BUREAU

The Western Society of Engineers frequently is requested to provide speakers for meetings and conventions in Chicago, often on short notice, many times on specific subjects. Generally the meetings are not technical and the subjects are of interest largely from a civic viewpoint. Occasionally, one of the sections of the Western Society finds itself without a speaker and requests assistance. To fill this need the Board of Direction has directed the Program Committee this year to organize a Speakers' Bureau which will prepare a list of speakers qualified and available to speak on engineering or industrial subjects allied to engineering as desired.

Many of our members who can speak with authority on such subjects would hesitate to volunteer for such duty but if called upon would be willing to serve the Society thus if called upon to do so. Those of you who know one or more members of the Society who can and will serve the Society in this way, are requested to advise the Chairman of the Speakers' Bureau accordingly.

A. W. Howson
Chairman, Program Committee

WSE Future Events

WSE
Fall Dinner

The annual fall dinner has been scheduled for October 25 and an outstanding speaker has been engaged for this event.

You all recall that the June meeting was a bang-up affair and from all reports everyone present had an enjoyable time. Those who couldn't attend, we've heard, have expressed a lot of disappointment.

Our speaker has gained an outstanding international reputation in his particular field and we urge that you make reservations as soon as possible.

The time, place, and cost of tickets, as well as the details concerning the speaker, will be announced in the October issue of MIDWEST ENGINEER.

HERE'S YOUR CHANCE

Almost every member of the Western Society of Engineers, at one time or another, has had a desire to tour one or more of the industrial plants of the Chicago area. If you have such an urge that has not been satisfied, tell the excursion committee about it. Possibly a W.S.E. excursion can be arranged. Drop a note to Claude C. Bowers, 1029 W. Adams St., Chicago, Chairman of the Arrangements and Excursions Subcommittee of the Program Committee.

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Machine Designers Engineers
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Engineering Service for Manufacturers
126 N. Union Ave., Chicago

At the

CHICAGO RAILROAD FAIR

Western Society Day

Monday, September 20

Your Excursion Committee has arranged for Western Society Day at the Chicago Railroad Fair.

For those who desire to eat at the fair, there will be a special Western Society Dinner at 6:15 P. M. in the HARBOR VIEW RESTAURANT, which is along the water-front just east of the 23rd Street Entrance. Reservations are required. The cost is $2.50.

You've heard how folks stand in line for hours to get tickets for WHEELS-A-ROLLING? The management of the Fair will allot us a block of tickets in advance of the 9:00 P. M. show at the regular price of sixty cents each, so you won't have to stand in line and can see the exhibits until time to take your seats.

Mark your calendar today with a big circle around the 20th of September as WESTERN SOCIETY DAY at the Chicago Railroad Fair.

Tear off the reservation blank below:

Western Society of Engineers
84 E. Randolph Street
Chicago 1, Illinois

Deadline for Reservations
September 17, 1948

Western Society Day At The Railroad Fair

No. of reservations		Cash enclosed for:
_____	Dinner at Harbor View Restaurant at 6:15 P. M. September 20, 1948 (Price $2.50)	$_____
_____	Tickets to "Wheels-a-Rolling" pageant of transportation development (Price 60¢)	$_____
	TOTAL AMOUNT ENCLOSED	$_____

Send tickets to:

_____

_____

_____

Make checks payable to the Western Society of Engineers.
Sorry, No Cancellations.

Women's Council

The Committee for Drafting a Constitution and By-Laws which is made up of Mrs. Frances Barnett and Misses Ruth Perkins and Beatrice Horneman, have made excellent progress. The first draft of the Constitution and By-Laws is ready and will be presented to the members for discussion and comments at the September meeting.

The Committee to Investigate Background and Basic Reasons for Pursuing "Equal Pay For Equal Work", which is made up of Mesdames Dorothy Merrill and Elizabeth Rueck and Miss Mary L. Murphy, have prepared a sample questionnaire to be used in obtaining the experience and opinions of women in the architectural and engineering professions and a copy has been given to each member of the division. As soon as these have been filled out and returned the Committee plans to tabulate the results and discuss them at a future meeting. The returns from this survey will also be used in formulating the aims, objectives and program of the Council and possibly the questionnaire will later be adapted for circulation, with Western Society approval, to a wider group including personnel representatives in industry.

A number of the professional women have been asked to serve on various committees of Western Society of Engineers. These include:

Publications—
Mrs. Dorothy Merrill
Miss Georgiana Peeney

Membership—
Mrs. Frances Barnett
Miss Ruth Perkins

Program—
Miss Mary L. Murphy
Miss E. Vera Lund
Miss Clara Lawrence

Library—
Miss Iris Ashwell

We as a group, are very pleased with this recognition by Western Society of Engineers, and will contribute in every way possible to the work of the committee to which we as individuals are appointed. Miss Ashwell has also been busy during the summer preparing a biographical sketch of each of the professional women to be used for various publicity during the coming year.

At present there are approximately forty qualified women on the mailing list of the Professional Women's Council, and of these almost twenty are either members of Western Society or have applied for membership. This has been accomplished since January with the help of the officers and board of Western Society. By the close of the next year, we hope to have the necessary forty members to enable us to attain full Division status in Western Society. We are truly appreciative of the opportunity which Western Society has extended to us both as individuals and as a group, to play a fuller part in the professions of architecture and engineering and to contribute to the community as well as to help those women who are just entering these professions. We would especially like to thank Don Steger, Mr. Imhoff, Mr. Kahler, and Mr. McClurg who have given so liberally of their time and advice in getting the group started and helping with the many organization details.

Membership Committee

1948-49 Membership Gain

Last year's gain of over 500 new members has inspired the Membership Committee headed by Herman Ross, Ed Slygh, and Carl Johnson, to take the bull by the horns this year and set their sights on a much larger gain by May 31, 1949.

This is going to mean a lot of teamwork on the part of the Membership Committee of Western Society.

It means that the organizational program of the Committee is going to be developed for formal announcement by October and it is also going to mean that every present member of the Society should hold himself responsible for obtaining one new member this year.

In these columns will appear from time to time a thermometer or indicator of the membership progress, and while we have a few new members to date, this hardly scratches the surface when you consider that there are over 10,000 potential members in the Chicagoland area.

These columns are hardly the place for a real down to earth pep talk, but Herman Ross tells us that by the time things are lined up for the October fall dinner meeting, a very impressive program will be formalized.

The Professional Women's Council is scheduled to meet the second Monday each month at the Western Society headquarters.

The meeting dates are as follows:

1948	1949
October 13	January 12
November 10	February 9
December 8	March 9
	April 13
	May 11
	June 8

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Junior Division

The Junior Division's seminar meetings, inaugurated so successfully last year, will be continued and the first meeting will be held Thursday, October 7. The subject will be "Engineering Psychology":

Program Schedule

The following program schedule has been set for the 1948-49 season of the Junior Division.

	1948	
October 7	Engineering Psychology	Social Rooms
November 2	"Kick-Off Dinner"	Engineers Club
December 2	Patent Law	Social Rooms
	1949	
January 6	To Be Announced	Social Rooms
February 3	Charles Ellet Papers	Social Rooms
March 3	To Be Announced	Social Rooms
April 7	To Be Announced	Social Rooms
May 9	General Social Meeting	Social Rooms

Speaker at the "Kick-Off Dinner" will be John P. Carmichael, sports authority on the staff of the Chicago Daily News.

Awards

One of the highlights of each year, is the Charles Ellet Award night which has been tentatively set for February. On this night the papers placed in competition for the Charles Ellet Award will be presented.

The award is symbolized by a loving cup on which is engraved, each time awarded, the name of the recipient and the name of his alma mater. The cup is kept in display in the Society rooms. As evidence of the honor bestowed, the recipient receives an engraved certificate. A prize of $25.00 also accompanies the award.

The award is made periodically to a Junior member who, in the opinion of a committee of awards, is adjudged to have excelled in the preparation and presentation of a technical paper presented in competition for this award at a meeting of the Junior Engineers.

It is hoped that each Junior member will consider competing for this award. Any member who plans to present a paper is asked to inform the Program Chairman of the Junior Division by December.

A second award which is open to members of the Junior Division is the Alfred Noble Prize. The Alfred Noble Prize was established in 1929 and consists of an award from the income of a fund contributed by engineers and others to perpetuate the name and accomplishments of Alfred Noble, Past President of both the Western Society and the American Society of Civil Engineers. The prize consists of a cash award, allowance for travel expense and a certificate signed by the president and secretary of the American Society of Civil Engineers, which society is trustee of the fund.

The award is open to any member, not past his thirty-first birthday, of the Western Society or any of the "founder" engineering societies and is given for a technical paper of particular merit on any subject accepted for publication by any of the foregoing five societies.

The recipient of the prize is selected annually by a committee composed of one representative from each of the five societies. The award is made at a general meeting of the society of which the recipient is a member.

As stated in its by-laws, the purpose of the Junior Division "is to promote the engineering attainments and advancement of the younger members of the Society; however, all members are eligible upon registration regardless of their grade of membership." It is to be noted that membership is not limited to Junior members of the Society.

The Junior Division was organized twenty years ago and many of the present members of the WSE were active in the early days of the Junior Division. This section was very active throughout the thirties and up until the early years of the War when, like so many groups composed of young people, it was compelled to discontinue its activities.

Shortly after the war the men who were last most active in the group planned to reorganize the Junior Division. The reorganization turned out to be very successful. Under the leadership of this nucleus of former members, new members were brought into the group and a well-rounded program begun.

Last year was the first full season since the war. The membership rose to fifty-seven. A very successful series of monthly seminar meetings was held in addition to several get-togethers of a social nature.

The Junior Division is looking forward to another successful year. All members of the Division are urged to take an active part in the group's activities and to introduce their friends to the Junior Division and the WSE. Senior members of the WSE are asked to encourage young engineers of their acquaintance to avail themselves of the opportunities offered by the Junior Division.

The Executive Committee of the Junior Division for the coming year consists of the following men:
Wm. F. Schlax, Chairman
J. P. Gnaedinger, Vice Chairman
R. E. Kraft, Secretary
G. W. Groepper, Chairman, Program Committee
C. G. Bergstrom, Chairman, Membership Committee
B. G. Anderson, Civic Committee
C. H. Hubbell, Chairman, Publicity Committee
J. Kucho, Jr., Library Committee
J. P. Weber, Program Committee
T. Van Zelst, Publicity Committee

Representatives on Junior Council for Technical Professions:
J. P. Gnaedinger—J. Kucho, Jr., Alternate
Wm. F. Schlax—R. F. Erickson, Alternate
Mr. Eldon A. Imhoff is Junior Division Adviser.

Letters to the Editor

***Editor's Note:** We are very anxious to enliven this column and keep the pot boiling with your viewpoints and opinions on general subjects or about the magazine.*

Letters should be limited to 100 words or less and your name will appear unless we are otherwise instructed. No unsigned letters will be printed.

WSE Headquarters

. . . Paint, Plaster, and Pennies

As you all know, we landed in our temporary fourth floor headquarters the night of April 30 and promptly established a "beach head" for operations.

Shortly after that, work began on the fifth floor so that structural changes could be made in time to accommodate the Engineering Societies Personnel Service office by August 1.

Space will not allow listing of the minute details of construction progress, but we can say that amid the nose and dust settling down upon us, we can see pipe lines coursing their way through the ceilings; we see walls going up on the fifth floor to accommodate the dining facilities and kitchen; we see holes being cut into the walls and the sides of the building to which will be attached other beams and walls to strengthen the sections in which structural changes are being made; we see changes being made on the seventh floor now that the walls have been knocked down and new walls are rising; we see preparations being made to pour concrete onto the steel beams which will support the seventh floor ceiling; and we move furniture and office machines here and there to accommodate the contractors and expedite the work of the men.

All of which adds up to the fact that the new Western Society headquarters is taking shape and the first meetings are scheduled for early in October for the seventh floor.

Now we come to the realistic part of all this, namely the dollars and cents cost. We want to invite every member of the Society to visit the new Headquarters and note the structural changes and improvements being made at 84 E. Randolph Street on the 5th, 6th and 7th floors, all of which is costing money. We are sure you will want to participate in this very timely and practical program and send in your contribution NOW.

New E.S.P.S. Director

Joseph R. Decker has been appointed manager of the Chicago office of the Engineering Societies Personnel Service, succeeding Thomas Wilson, retired. The Board of Directors, Engineering Societies Personnel Service, Inc., announced this change effective August 16, 1948.

Mr. Decker, formerly Lieutenant Commander, U. S. Navy "Seabees" and Chief, Training Facilities, Veterans Administration, was for many years Engineer and Sales Representative for a large electrical products manufacturer with offices in Chicago and Detroit.

Mr. Wilson, who is retiring to private life after sixteen years with the Service, has made many friends in the Chicago and midwestern region.

Personals

Krol and Hastrup, Engineers, Inc., at 542 S. Dearborn St., is the former Krol-Hastrup-Kreda, Engrs., Inc. Harold K. Hastrup is a WSE member.

WSE Office Hours

Due to structural changes we are continuing with summer office hours during September.

Beginning October 1, office hours will be 9 a.m. to 5 p.m. Monday through Friday and 9 a.m. to 1 p.m. on Saturdays.

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